

# Scientific Writing & Presentation (学术论文写作与报告)

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#### About you and me

#### About me

- > 2001 2005: Northwestern Polytechnical University, Xi'an, China Degree: B.Sc. in Electrical Engineering
- > 2005 2008: Northwestern Polytechnical University, Xi'an, China Degree: M.Sc. in Control Theory
- > 2008 2013: Hamburg University of Technology, Germany Degree: Ph.D. in Aerospace Engineering

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Research/Teaching on: Transportation networks

Since April 2015: Beihang University, Beijing, China Position: Associate Professor

[http://www.ee.buaa.edu.cn/info/1202/22838.htm]









### About our group



M3Nets (Multi-Modal Mobility Networks)

Our focus is on developing scalable algorithms and analysis techniques for large transportation networks

- 1) Global Transportation Networks
- 2) Big Data Management
- 3) Scalable Network Design
- 4) Complex Network Resilience

More information can be found here: http://m3nets.de





## And you...



## About you

- How many are master/phd students?
- Do you have any academic writing or presentation experience?
- What is your future career goal?
- What do you expect from attending this course?
- What else do you want everybody to know?

## Course Introduction

- **Content:** Introduction, Writing tools, Paper writing, Thesis writing, Presentation
- **Teach Method :** Teaching + Case study
- **Test and Exam:** Attendance (in-class quiz) 30%, project report 70%

### Reference list

- Stanford library card catalog refers to **more than 100** books about technical writing.
- A journal devoted to academic writing.
- > IEEE Transactions on Professional Communication
- My advice is **experience**.

## Outline

- 1.1 What is scientific writing?
- 1.2 **Why** it is important?
- 1.3 **How** to improve it?
- 1.4 **Where** to publish it?

"In science, the credit goes to the man who convinces the world, not to the man to whom the idea first occurs."

--Sir William Osler, a Canadian physician and professor of medicine, he played a key role in transforming the organization and curriculum of medical education

"Writing is an art. But when it is writing to inform it comes close to being a science as well."

--Robert Gunning, The Technique of Clear Writing

1. Academic writing means that the scholars publish and shares their research results in some books, journals, and conferences.



Earlier time

Now

2. The earliest journal: Philosophical Transactions of the Royal Society,

17<sup>th</sup> century.

(887) **PHILOSOPHICAL** TRANSACTIONS.

June 25. 1677.

- 3. Categories:
- **Books** (too slow and too long)
- Journals (quick and important)
- Conferences (quicker)
- **Thesis** (summary of degree study)



#### 738 pages, 14 chapters

IEEE Journal 15 pages, 7 sections



#### HE TOWER OF KNOWLEDGE

SCENE INTERPRETATION

WITH

Thesis for Imperial College London 138 pages, 6 chapters

4. Index

A citation index is a kind of bibliographic **database**, an index of citations between publications, allowing the user to easily establish which later documents cite which earlier documents.

- **SCI** (web of knowledge)
- **EI** (Engineering Index)
- **ISI Proceeding** (web of knowledge)

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3D Scene interpret	tation by combining probability theory and logic: The tower of knowledge	Citation Network
By: Xu, M (Xu, Mai) <sup>[1]</sup> ; Petro	u, M (Petrou, Maria) <sup>[1]</sup>	
		11 Times Cited
COMPUTER VISION AND IM	AGE UNDERSTANDING	60 Cited References
Volume: 115 Issue: 11 Pag		View Related Records
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Abstract		caaza grom Web of Science To Core Collectio
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	to participate in a specific action. A recursive version of the architecture is also proposed, in which the distributions of the forme	0 in Data Citation Index
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proves to be able to cope very	well even without any training data, where it learns the characteristics of the various components by simply applying the pre-	
programmed logic rules that co	onnect labels, actions and attributes. (C) 2011 Elsevier Inc. All rights reserved.	Usage Count
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4	1	ACM [全文]	
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	4	APS [全文]	
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	9	Begell [全文,电子图书]	
	10	Cambridge [全文]	
	11	CRC-MechanicalENGINEERINGnetBASE [全文]	
	12	EBSCOhost(ASP、BSP、ERIC) [全式]	2. A website operated by Elsevier.
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	14	Emerald [全义]	
	15	EV2(Ei Compendex) [文摘]	
	16	Fortune [全文]	
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	20	IMechE [全又]	Engineers
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33	PQDT [全文]	
34	ProQuest(原CSA平台) [文摘]	
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36	SAGE Deep Backfiles [全文]	
37	Science Online [全文]	
38	Scientific Research Publishing [全文]	
39	SciFinder [文摘]	
40	Scitation(AIP、ASME) [全文]	
41	Scopus [文滴]	
42	SPIF (	
43	SpringerLink [全文]	>
44	Taylor & Francis Journals [&文]	
45	The Royal Society Online Journals [全文]	
46	Web of Knowledge [文摘]	>

4. The world's most cited scientific journal

- 5. Springer provides its e-books and journals.
- 6. The famous SCI and ISI proceeding.

Scientific writing follows a **rigid** structure – a format developed over hundreds of years

Consequently, a paper can be read at **several levels**:

- Some people just will refer to the title
- > Others may read only the title and abstract
- > Others will read the paper for a deeper understanding

#### A scientific article as a critical argument

- Statement of problem; posing a question
- Presentation of evidence
- > Assessment of the validity of the evidence in the face of ..
  - strengths/weaknesses
  - > other evidence
- Conclusions

#### The process of scientific writing

- Create an outline first
- > Plan on multiple drafts:
  - Filename with dates
  - > One filename written over with new draft
- Tables/figures early: prompt more analysis
- Deadlines for you and coauthors

<b>Paper Sections</b>	<b>Experimental Process</b>		
Title & Authors	Who did the work?		
	<ul> <li>Describes the paper's content clearly and precisely including keywords</li> <li>It is the advertisement for the article</li> <li>Do not use abbreviations and jargon</li> <li>Search engines/indexing databases depend on the accuracy of the title - since they use the keywords to identify relevant articles</li> </ul>		

Paper Sections	<b>Experimental Process</b>
Title & Authors	Who did the work?
Abstract	What did I do in a nutshell?
	<ul> <li>Briefly summarize (often 150 words) - the problem, the method, the results, and the conclusions</li> <li>The reader can decide whether or not to read the whole article</li> <li>Together, the title and the abstract should stand on their own</li> <li>Many authors write the abstract last so that it accurately reflects the content of the paper [http://research.mlanet.org/structured_abstract_</li></ul>

Paper Sections	<b>Experimental Process</b>		
Title & Authors	Who did the work?		
Abstract	What did I do in a nutshell?		
Introduction	What is the problem?		
	<ul> <li>What is the problem?</li> <li>Clearly state the: <ul> <li>Problem being investigated</li> <li>Background that explains the problem</li> <li>Reasons for conducting the research</li> </ul> </li> <li>Summarize relevant research</li> <li>State how your work differs from published work</li> <li>Identify the questions you are answering</li> <li>Explain what other findings, if any, you are challenging or extending</li> </ul>		

Paper Sections	<b>Experimental Process</b>	
Title & Authors	Who did the work?	
Abstract	What did I do in a nutshell?	
Introduction	What is the problem?	
Literature Review	What is the state-of-the-art?	

- What has been done and what can you say that's new?
- Be thorough in your search: a high sensitivity/low specificity search.

Paper Sections	<b>Experimental Process</b>
Title & Authors	Who did the work?
Abstract	What did I do in a nutshell?
Introduction	What is the problem?
Literature Review	What is the state-of-the-art?
Methodology	How did I solve the problem?

- Provide the reader enough details so they can understand/replicate your research
- Explain how you studied the problem, identify the procedures you followed, and order these chronologically where possible
- Explain new methodology in detail; otherwise name the method and cite the previously published work
- Be precise in describing experiments and include potential bias or design limits

Paper Sections	<b>Experimental Process</b>		
Title & Authors	Who did the work?		
Abstract	What did I do in a nutshell?		
Introduction	What is the problem?		
Literature Review	What is the state-of-the-art?		
Methodology	How did I solve the problem?		
<b>Results &amp; Discussion</b>	What did I find out? & What does it mean?		

- Objectively present your findings, and explain what was found
- Show that your new results are contributing to the body of scientific knowledge
- Follow a logical sequence based on the tables and figures presenting the findings to answer the question or hypothesis
- Describe what your results mean in context of what was already known about the subject
- Indicate how the results relate to expectations and to the literature previously cited

Paper Sections	<b>Experimental Process</b>		
Title & Authors	Who did the work?		
Abstract	What did I do in a nutshell?		
Introduction	What is the problem?		
Literature Review	What is the state-of-the-art?		
Methodology	How did I solve the problem?		
<b>Results &amp; Discussion</b>	What did I find out? & What does it mean?		
Conclusions	Recap what did I do in a nutshell?		

- Explain how the research has moved the body of scientific knowledge forward
- Do not extend your conclusions beyond what is directly supported by your results avoid undue speculation
- Outline the next steps for further study

#### **Basic structure of journal-style scientific papers**

Paper Sections	<b>Experimental Process</b>		
Title & Authors	Who did the work?		
Abstract	What did I do in a nutshell?		
Introduction	What is the problem?		
Literature Review	What is the state-of-the-art?		
Methodology	How did I solve the problem?		
<b>Results &amp; Discussion</b>	What did I find out? & What does it mean?		
Conclusions	Recap what did I do in a nutshell?		
Acknowledgments	Who helped me out?		
References	Whose work did I refer to?		
Appendix	Extra information		

http://abacus.bates.edu/~ganderso/biology/resources/writing/HTWsections.html

#### About references

- > Whenever you draw upon previously published work, you must acknowledge the source
- Any information not from your experiment and not 'common knowledge' should be recognized by a citation
- How references are presented varies considerably refer to notes for authors for the specific journal
- > Avoid references that are difficult to find
- > Avoid listing related references that were not important to the study

#### About references

- Use a computerized bibliographic program.
- Follow journal guidelines (may request alphabetical listing or order of appearance in the text).
- Follow standard abbreviations (can be found online).
- Some journals limit number of references allowed.

## About authors listing

- ONLY include those who have made an intellectual contribution to the research
- OR those who will publicly defend the data and conclusions, and who have approved the final version
- Order of the names of the authors can vary from discipline to discipline
  - > In some fields, the corresponding author's name appears first
- Establishes responsibilities in paper writing
  - Avoids hurt feelings

#### About acknowledgements

- Funding sources
- Contributors who did not get authorship (e.g. offered materials, advice or consultation that was not significant enough to merit authorship).

#### 5. An example (one journal paper)



Abstract-The latest High Efficiency Video Coding (HEVC) standard significantly increases the encoding complexity for improving its coding efficiency, compared to the preceding H.264/AVC standard. In this paper, we present a novel subjective-driven complexity control (SCC) approach to reduce and control the encoding complexity of HEVC. Through reasonably adjusting the maximum depth of each largest coding unit (LCU), the encoding complexity can be reduced to a target level with minimal visual distortion. Specifically, the maximum depths of different LCUs can be varied through solving the proposed optimization formulation of complexity control, based on two explored relationships: the relationship between the maximum depth and encoding complexity, and the relationship between the maximum depth and visual distortion. Besides, the subjective visual quality is favored with a novel subjective-driven constraint imposed in the formulation, on the basis of a visual attention model. Finally, the experimental results show that our approach can achieve a wide range of encoding complexity control (as low as 20%) for HEVC, with the smallest complexity bias being 0.2%. Meanwhile, our SCC approach outperforms other two state-ofthe-art complexity control approaches, in terms of both control accuracy and visual quality.

Index Terms-Complexity control, maximum depth, HEVC.

#### I. INTRODUCTION

RECENTL<sup>1</sup>, murresontion vuess affel large-sized bringing about perfect visual enjoyment but at the same time huge challenge on communication bandwidth. It is labored for the once-booming H.264/AVC to complete this challenge with its available coding efficiency, thus motivating the birth of a new video coding efficiency, thus motivating the birth of a new video coding standard, called High Efficiency Video Coding (HEVC). The draft of HEVC was issued in January, 2013, and many works have been done to constantly improve its coding efficiency.

Compared to H\_264/AVC, HEVC can save bit rates by about 50% with comparable video quality [1]. This eminent coding efficiency mostly benefits from the new coding tree unit (C-TU) block partitioning structure, diverse intra linter prediction modes, and other cuting-edge techniques [2] [3]. Along with the remarkable performance of coding efficiency, the encoding complexity of HEVC increases dramatically, ranging from

X. Deng, M. Xu, L. Jiang, and Z. Wang are with the School of Electronic and Information Engineering. Behang University, Beying, 100191 Chain (email: candydreng/100/ganal.com, Maxai(Buazed et al., janglac.chain@alyma.com, varsing@bbaa.eds.cn). M Xu is the corresponding andhood this paper. X Suns is with Annova Televanch Ana, Beying 10000lamovation Center of Groupstal Technology. This work was supported by NSFC under grant number 01202192 and 04141022.

9% to 50% higher than H.264/AVC [4]. However, most of multimedia-ready devices, such as portable computers, pads, and smartphones, do not have the ability to sustain such massive complexity due to their limited computational powers. Therefore, the development and research on video coding should not only fasten on enhancing the coding efficiency. but also consider the computational complexity.

Complexity control is rather important for HEVC. On one hand, with the continuous demand for videos at higher resolutions, the complexity of video coding tremendously increases

highest so far. On the other hand, the amount of multimedia devices has been growing explosively from 2007 onwards (first generation of iPhone appeared). More and more portable devices featured by encoding and decoding videos are favored by consumers, such as matrybones, pads. carePCs, and other mobile devices. However, their computational powers vary from one device to another. Thus, for better development and implementation of HEVC on various platforms with disparte complexity counted approach for HEVC.

For the past decades, extensive work has been done to

standards [5]-[7]. More specifically, for H.263, Ismaeil et al. [5] evaluated the complexity of four most time-consuming components in encoding process, including the motion estimation, discrete cosine transform (DCT), quantization, and mode selection. Each of the four components can be configured to reduce the encoding complexity. By globally assembling the four components with optimal configurations, complexity control can be achieved. Afterwards, dealing with the macroblock in H.264/AVC, Kannangara et al. [6] proposed an early skip macroblock mode prediction algorithm on the basis of a Bayesian framework. Through reasonably modifying the Bayesian maximum likelihood criterion which decides the threshold for early skip, the actual complexity of [6] can be reduced to a target complexity. For HEVC, complexity control mechanism may be related to the new CTU partitioning scheme. For example, Corrêa et al. [7] explored the relationship between the coding unit (CU) depth and coding complexity, and then they proposed to constrain the maximum LCU depths of certain frames the same as those of the previous frames, rather than exhaustive rate distortion optimization (RDO) search. By means of adjusting the number of those constrained frames, the encoding complexity can match the target complexity. However, the above methods do not take

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#### → 3. Abstract

#### ◆ 4. Index

5. Introduction (background/motivation/contributions)

visual distortion optimization into consideration during the process of complexity control. Besides, with the deeper study of the human visual system (HVS), it has been found that human attention does not focus on the whole picture when watching a video, but merely a small region around fixation points [8]. In the research fields of rate control and video quality assessment, the subjective quality of reconstructed videos has been considered as an important criteria, in addition to the traditional objective rate distortion (RD) performance. However, to our best knowledge, for HEVC there is no complexity control approach which considers the subjective factors for ensuring the subjective quality of compressed videos.

In this paper, we propose a subjective-driven complexity control (SCC) approach, based on the visual attention model developed in [9] and our previous work [10], to effectively control the encoding complexity of HEVC. The central of our SCC approach is to vary the maximum depth of each largest coding unit (LCU), with the constraint on a given traget complexity and minimal objective distortion. Beyond, different from the previous complexity control approaches, the subjective visual quality can be favored in our SCC approach, since the LCUs with larger weight have priority on less distortion, at the same optimal objective quality.

The main contributions of our SCC approach in this paper are presented as follows:

- We investigate the influence of the maximum depth of LCU on encoding complexity and visual distortion. In this paper, we explore the relationship between the maximum depth of LCU and the overall encoding complexity. Besides, generally speaking, smaller maximum depth may result in larger visual distortion for each LCU. In this paper, we also build the relationship between the maximum depth of LCU and visual distortion.
- We model the encoding complexity control problem of HEVC by proposing an optimization formulation with a constraint on subjective quality. Specifically, the visual distortion caused by reducing maximum depths of LCUs can be minimized, while decreasing encoding complexity to a target. Meanwhile, subjective quality can be fivored by integrating the visual attention model. Liu *et al.* [11] employed a similar algorithm to allocate more complexity resources to salient regions. However, it is used to decrease the decoding complexity of H.264/AVC, but not to control encoding complexity.
- We propose a solution to our optimization formulation. Our solution yields various maximum depths for LCUs, to achieve target encoding complexity with minimal visual distortion. [7] also utilized the LCU partition to control the encoding complexity. Actually, the complexity is controlled by predicting maximum LCU depths, based on the similarity of LCU partitions between neighboring frames. This frame-level control may result in large fluctuations of visual distortion and encoding complexity. Our approach controls the encoding complexity at LCU level. which is able to avoid such a disdvantae.

This paper is organized as follows. In Section II, we briefly review the related work. Section III introduces the visual

attention model used in our approach. In Section IV, details about the proposed SCC approach are discussed. Then, the experimental results are shown in Section V to verify the effectiveness of our approach. Finally, Section VI concludes this paper.

2

II. PREVIOUS WORK ON COMPLEXITY CONTROL

Almost every new video coding standard was developed, followed by numerous work on reducing or controlling its encoding complexity, since the encoding complexity of a new standard is usually multiplied compared to its previous generation. For the past few years, plenty of work has been delivered, with the intention to reduce encoding complexity or achieve complexity control. In the following, we briefly review the relevant work on this direction.

A. Encoding complexity reduction work

Effective complexity reduction is the premise of complexity control. Many studies have been devoted to this work for both H.264/AVC and HEVC.

For H.264/AVC, most of the encoding complexity reduction studies focused on the motion estimation (ME) [12]-[15] and mode decision (MD) [16]-[20] processes, which are the two most time-consuming functions in H.264/AVC. Literature [12]-[14] developed various ME early termination schemes to reduce the complexity of ME process. Literature [16], [17] proposed several early termination methods for MD complexity reduction, by predicting whether a macroblock is of SKIP mode or not. Different from the early termination related methods, [15] proposed a context-based ME complexity reduction approach. In this approach, the complexity can be reduced by adaptively decreasing the number of searched reference frames. In [18]-[20], various approaches were developed to shrink the optional inter/intra modes in the RDO process, thus decreasing MD complexity. Literature [21] employed a hybrid approach by jointly optimizing MD and ME processes to save the encoding time of H.264/AVC.

For HEVC complexity reduction, extensive studies pay attention to the new block partitioning scheme which leads to huge encoding complexity. Among these studies, [22]-[24] devoted to find ways to reduce the encoding complexity on exhaustively searching for optimal CU sizes in the block partitioning process. Specifically, Leng et al. [22] proposed an early CU depth prediction approach at frame level. The basic idea of this approach is to skip some CU depths which are rarely used in the previous frames, thus simplifying the RDO search process to save encoding complexity. Literature [23] developed similar approaches at CU level, with the central idea to narrow the current CU depth search range, by virtue of the depth information of adjacent CUs. In addition, some early prediction unit (PU) and transform unit (TU) size decision methods were proposed in [25]-[27] to speed up the PU and TU size selection process. Specifically, Yoo et al. [26] checked the code block flag (CBF) and RD cost of the current PU to terminate the prediction process of the next PU for complexity reduction. Corrêa et al. [28] used data mining tool to early terminate the RDO process for determining the CU, PU, and TU partitions. Except for CU, PU, and TU size decisions, there ◆6. Related work (where is the state-of-the-art)

3

are still other components in HEVC affecting the encoding can be reduced to different levels. In this paper, by adjusting complexity, such as in-loop filtering, and multi-directional intra predictions. From these aspects, [29]-[31] provide several RDO process for selecting the optimal CU sizes of certain methods to reduce the encoding complexity of HEVC.

#### B. Encoding complexity control work

Benefitting from the above encoding complexity reduction methods, it is feasible to achieve complexity control for video coding. There exist lots of complexity control approaches, which can be classified into the following three main categonies

The first complexity control philosophy stems from the plexity, through rational allocation of complexity resources, the actual running complexity can approach the target, while keeping RD performance well. Approaches in [32], [33] were proposed for H.264/AVC to allocate the encoding complexity in terms of the distortion (e.g., sum of absolute difference, SAD) of each macroblock, in which higher distortion corresponds to more complexity resources. A rate-control-like procedure was developed in [34] for complexity control of H.264/AVC. It employed a novel lagrange complexity-ratedistortion (C-R-D) cost model to make a tradeoff between the video quality and complexity cost. Unlike the aforementioned complexity allocation approaches, our SCC approach wise weights for visual saliency. This way, the subjective visual quality can be favored.

The heuristic of the second complexity control category is exploiting several encoding parameters to make complexity configurable. Typically, [35] proposed to manage the complexity of H.264/AVC through adjusting parameters to control ME and MD processes, based on complexity configurable motion estimation (CAME) and complexity configurable mode decision (CAMD) algorithms. Most recently, Zhao et al. [36] proposed a flexible mode selection approach for HEVC using a global complexity control factor. Through a hierarchical complexity allocation scheme, the overall RD performance can be maximized. However, it is hard to reach a specific target complexity, as only a few parameters can be configured. In this paper, we propose a complexity control approach, in which control is large such that the encoding complexity can be reduced to a specific target.

The last kind of approaches leverage various early termination algorithms to control complexity. Corrêa et al. [7] achieved HEVC complexity control by means of predicting the maximum depths of LCUs. In this approach, frames are divided into two categories: unconstrained frames (Fu) and constrained frames (Fc). The maximum depths of LCUs in Fc are early determined, the same as the maximum depths in its different early terminate thresholds, the encoding complexity videos may be down-sampled for detecting saliency with the

the maximum depths of LCUs, we can early terminate the LCUs. This way, the encoding complexity can be saved and meanwhile controlled. The advantage of our approach is that the distortion optimization is considered, when decreasing the encoding complexity.

Actually, there are few complexity control approaches proposed for HEVC, since this new standard was just launched not so long ago. Furthermore, to our best knowledge, the existing approaches do not take into account subjective quality when controlling the encoding complexity for HEVC. In this paper, prevailing complexity allocation thought. Given a target com- we propose an SCC approach to precisely control the encoding complexity of HEVC. By utilizing the bottom-up/top-down visual attention model, our approach can not only control encoding complexity with minimal visual distortion, but also preserve subjective quality well.

III. VISUAL ATTENTION MODEL

This section describes the visual attention model, as the foundation of the proposed SCC approach. According to the HVS, there exists much perceptual redundancy that can be further exploited to improve coding efficiency without significant perceived quality degradation. For instance, when distributes the complexity resources according to the pixel- a person looks at a video, he/she may not pay attention to the whole scene. In other words, a small region around a point of fixation is concerned most [38], while the peripheral region is captured at low resolution. In light of this phenomenon, the computational complexity can be saved in our SCC approach via decreasing the visual quality in the peripheral region with high priority.

From now on, we mainly focus on the visual attention model, which predicts where human looks at a video, as the preliminary of the proposed SCC approach. To predict human visual attention, both bottom-up and top-down models can be utilized for vielding the pixel-wise weight map of each video frame, reflecting the saliency values of different pixels. Specifically, in light of study on the HVS, several low level features have been developed for the bottom-up model of saliency detection. A representative bottom-up model is [9], the complexity is controlled through reasonably varying the in which the low level features of color, intensity, and motion maximum depth of each LCU. Due to the large number of are integrated to yield saliency maps of videos. However, for LCUs in each frame, the freedom of degree for complexity the conversational videos, face is a consensus top-down visual cue for saliency detection. As such in [10] the face is used as a high level feature for yielding the saliency maps of video frames. In this paper, we therefore apply bottom-up [9] and top-down [10] models in our SCC approach to provide the weights of saliency, for encoding generic and conversational videos, respectively

For the bottom-up visual attention model, we apply phase spectrum of guaternion Fourier transform (POFT) algorithm [9] to calculate the weight maps for all frames in a video. previous Fu frame, thus decreasing the RDO process complex- due to its high accuracy and low complexity. For example, ity to a specific target. Ren et al. [37] proposed to make use [9] has shown that the POFT algorithm consumes less than of spatial and temporal information to early terminate the MD -1 ms for computing the weight map of a  $800 \times 600$  video process for H.264/AVC complexity control. Through setting frame on a Windows PC with C/C++ platform. Note that the

#### →7. Preliminary (the basis)

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where Nrepresent 0, 1, and PQFT algorithm, once videos have high resolutions or there is the requirement on less computational time. The normalized weight map  $\mathbf{v} = \{v_n\}_{n=1}^N$  ( $v_n \in [0,1]$ ) for an N-pixel video frame can be computed in the PQFT algorithm by

$$v = g * \sum_{t=0}^{\infty} \rho_t^2$$
, (1)

where q is a two-dimensional Gaussian filter to smooth the weight map. In addition,  $\rho_t$  is the quaternion representation on four feature maps over the video frame, reconstructed by the phase spectrum of quaternion Fourier transform on these maps. Note that the four feature maps include two color channels, one intensity channel, and one motion channel. For more details refer to [9]

For the top-down visual attention model, we simply utilize our hierarchical perception model of face [10] to output the weight maps, when encoding conversational video frames in our SCC approach. It is because the face is an evident cue for the visual attention model. It has been pointed out in [10] that facial regions are much more salient than background. Among the facial regions, facial features (e.g., eyes and mouth) are more visually significant than others, bringing about greater saliency. Therefore, the facial features should have the greatest weight, followed by the facial regions and then the background. Accordingly, pixel-wise weight map  $\mathbf{v} = \{v_n\}_{n=1}^N$  of a conversational video frame can be estimated as follows

$$v_n = \begin{cases} 1 & n \in \mathbf{R}_1 \\ v' & n \in \mathbf{R}_2 \\ v'' & n \in \mathbf{R}_3, \end{cases}$$

(2)

where R1, R2, and R3 are the facial feature region, other facial region, and background. Here, these regions can be obtained using the same way as [10], in which the face and facial features are extracted according to the 66 landmarks of the real-time face alignment [39]. For less complexity, the 3000 fps face alignment [40] may be used for obtaining these regions instead of [39]. In (2), v' and v'' (v'' < v' < 1) are the weights of regions R2 and R3, respectively. In this paper, we follow [10] to set v' = 0.4 and v'' = 0.2. Note that these values are based on the eye tracking results on viewing conversational videos. Besides, v needs to be smoothed with two-dimensional Gaussian filter q as well. See [10] for more details

Figure 1 shows examples for both top-down and bottom-up weight maps. From this figure, we can see that the weight map of the visual attention model utilized in this paper is able to roughly reflect the saliency of a video frame. However, the top-down map may miss some important regions in the background. Thus, the integration of bottom-up and top-down models for determining the weights is possible to make the saliency prediction more effective. As this paper mainly works on the complexity control for HEVC, the refinement of the visual attention model may hold for the future work.

By using the visual attention model, we can obtain the saliency weight for each pixel, which can be used to calculate the weight for each LCU. The weights of LCUs have important effect on favoring subjective quality in our SCC approach,





(c) RaceHorses (the 4-th frame) (d) Weight map of (c) Fig. 1. Examples of weight maps. The intensities in saliency maps, ranging om 0 to 1, represent the output weights of pixels. Note that the map of Johnny is the output of the top-down visual attention model [10], whereas the map for RaceHorses is detected by the bottom-up model [9]

since they influence the maximum depth allocation to each LCU. Next section shows the details about how to incorporate

#### IV THE PROPOSED METHOD

In this section, we move to our SCC approach, based on the visual attention model of Section III, for the complexity control in HEVC. Since the quad-tree based CTU partition takes a majority of encoding complexity in HEVC [41]. it is possible to control encoding complexity of HEVC by setting various maximum depths  $\{d_t\}_{t=1}^{I}$   $(d_t \in \{3, 2, 1, 0\})$  in advance to all I LCUs in each video frame.

Before introducing our work, we first briefly review the LCU partition structure in HEVC. During the partitioning process of the *i*-th LCU, the RDO algorithm is exhaustively executed to select the optimal depth of each CU under the constraint of maximum depth  $d_t$ . We illustrate an example of LCU partitioning structure in Figure 2. As shown in this figure, the RDO algorithm is executed in the following repeated way: If the RD cost of root CU is larger than the aggregated RD cost of its leaf node CUs, the splitting of root CU is implemented; Otherwise, the root CU is not allowed to be split. Thus, the RDO process needs to compute the RD costs of CU sizes at all four depths (i.e., 3, 2, 1, 0), once  $d_i$  is set to be the largest as 3, to finally choose the best one. This selection process indeed consumes huge complexity. However, if  $d_i$  is set to be 2, the splitting process has to be terminated once the CU sizes are reduced to  $16 \times 16$  (i.e., splitting is stopped at layer  $d_1=2$  in Figure 2.). As such, only the RD costs of CUs at three depths (i.e., 2, 1, 0) need to be compared by RDO process, resulting in less complexity. The smaller  $d_t$  is set, the larger complexity can be saved. Thus, the maximum depth  $d_t$  has a crucial effect on reducing the encoding complexity of HEVC [7].

The main cost on the above encoding complexity reduction is the visual distortion, defined by  $\Delta D(d_t)$  which indicates the increased distortion of the i-th LCU, caused by reducing its maximum depth to d<sub>1</sub>. Actually, such visual distortion can be minimized in our approach. Beyond the minimization of visual distortion, subjective quality can be favored with the following constraint:

> $\forall w_i \ge w_l$ ,  $\Delta D(d_i) \le \Delta D(d_l)$ . (3)

#### ▶ 8. The proposed method (details)

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Fig. 5. An example of the sorted weight

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(c) Johnny@100% (d) Johnny@ 20% complexity Fig. 6. Examples for the maximum depths distribution of LCUs in two frames. (a) and (b) show the 4-th frames of *RaceHorzes*; (c) and (d) show the 272-th frames of Johnny. Note that the maximum depths of LCUs in (a) and (c) are all equivalent to 3 depths of LCUs with relatively smaller weights. For instance the grass region in RaceHorses has smaller weights (as it draws little human attention), such that smaller maximum depths are imposed to the LCUs of grass. V. EXPERIMENTAL RESULTS In this section, experiments were conducted to validate the effectiveness of the proposed SCC approach. The effectiveness was evaluated from four aspects: the control accuracy, objective visual quality, subjective PSNR, and BD-Rate/BD-PSNR. In the experiments, we only compared our approach with the state-of-the-art approaches [7] and [23]. Note that we did not compare with [36] which is also a state-of-the-art approach, as it cannot precisely control the complexity<sup>4</sup>. A Test sequences and parameter setting The test video sequences were chosen from Classes B, C, D, and E in the standard HEVC test sequence database, as shown in Table II. For thoroughly evaluating the performance of our approach, all the test sequences were divided into two sets: with and without rate control. In the rate-control set, the video sequences were compressed at two target bit rates, by the

default rate control scheme. The quantization parameter (QP) value for the first I frame was set to be 32 by default, and QP values for other frames were determined by the rate control scheme. In the non-rate-control set, the video sequences were compressed with four fixed QPs (i.e., 22, 27, 32, and 37), to evaluate the performance of BD-Rate and BD-PSNR.

The encoder configuration we used in all experiments is low-delay P main<sup>5</sup>, following the test configurations of [7]

<sup>4</sup>In [36], a global complexity factor, ranging from 0 to 1, needs to be set for different encoding complexity. However, the time saving is only proportional to the predefined complexity factor, but not satisfy the specific target. <sup>5</sup>Our approach can also be applied to other configurations, such as random

access (RA), but the relationships of Section IV need to be re-trained.

TABLE II THE TEST VIDEO SEQUENCES.

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maximum depth to each LCU in terms of

(b) RaceHorses@ 60% complexit

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Sequences	Class	Resolution	Frames	Rate control
BashetballDrive	В	1920×1080	300@50fps	Enable
Cactus	в	1920×1080	300@50fps	Enable
Kimono	В	1920×1080	240@24tps	Disable
BQMail	С	832×480	300@00tps	Enable
PartyScene	С	852×480	300@30tps	Enable
Racehorses	С	832×480	300@30fps	Disable
BasketballDrill	С	832×480	300@50fps	Disable
RaceHorses	D	416×240	300@30fps	Enable
BasketballPass	D	416×240	300@30tps	Enable
BlowingBubbles	D	416×240	300@30tps	Disable
BOSquare	D	410×300	300@00tps	Disable
Johnny	E	1280×720	300@60fps	Enable
Vidyo4	E	1280×720	300@60fps	Enable
Fourpeople	E	1280×720	300@60fps	Disable

TABLE III THE PARAMETER SETTINGS OF HM 14.0



and [23]. Since HEVC common test conditions do not test Class A in the low-delay case, this class was not included in our experiments. Class F was not tested as well, as it is with non-camera captured content. Note that all test sequences are

All experiments were implemented on HM 14.0 platform, with the typical parameter settings presented in Table III. From this table we can see that the maximum LCU denth was initially set to 3. The LCU size was chosen to be  $64 \times 64$ to allow all possible CU sizes, i.e.,  $64 \times 64$ ,  $32 \times 32$ ,  $16 \times 16$ , and  $8 \times 8$ , for optimizing the distortion in HEVC. Some fast encoding modes such as FEN, FDM, and TransformSkip were enabled in our approach. Our approach may be incorporated with other fast encoding methods, with the relationships of Section IV being re-trained. It is worth pointing out that our, [7], and [23] approaches all used the same parameter settings on the HIM 14.0 platform

#### B. Evaluation on control accuracy

The experimental results in Tables IV, V, VI, and VII demonstrate the accuracy of controlling encoding complexity in the proposed SCC approach. In these tables, the encoding complexity is normalized to be the form of percentage, via being divided by the encoding time of conventional HM 14.0. Note that our, [7], and [23] are all reduced to the conventional HM 14.0, when the encoding time is set to 100%. From these tables, one can see that our SCC approach is capable of precisely controlling the encoding complexity of HEVC. Specifically, the actual encoding complexity is quite close to the target complexity. Among all test sequences across different bit rates, the least error is only 0.2% ( Cactus 20% @5 Mbps). Except from Class D sequences at 20% complexity, the largest control error is 4.6% ( BasketballDrive 80% @5 Mbps). Our approach does not perform well in Class

#### 9. Experimental results (details)



(a) Racehorses our approach at 300 kbps

(b) Acceloruse: with [7] at 300 ktps

(c) Racehorse: with [23] at 300 kbps Fig. 9. The 32-th frames of sequence Racehorse: compressed by our, [7] and [23] approaches, at 60% encoding complexity.



(a) BQMall with our approach at 500 kbps.



(b) BQMall with [7] at 500 kbps.

(c) BQMali with [23] at 500 kbps.

Fig. 10. The 54-th frames of sequence BQMall compressed by our, [7] and [23] approaches, at 60% encoding complexity.

12

different encoding complexity, using the method in [48]. Table IX reports the results of BD-Rate and BD-PSNR averaged over all six test sequences. Since [7] and [23] cannot control the complexity to 20%, their corresponding BD-Rate and BD-PSNR results at 20% are not reported. It can be observed from Table IX that compared with [7] and [23], our approach can achieve higher Y-PSNRo at the same bit rates, or save some bit rates at the same distortion. Besides, our approach, especially at low complexity, can significantly improve the control accuracy over [7] and [23].

VI. CONCLUSIONS

In this paper, we proposed a novel approach, namely SCC, for encoding complexity control in HEVC. It was argued that the maximum depth of each LCU exerts an important effect on the encoding complexity of HEVC. Therefore, with numerical analysis, we first investigated the relationship between the maximum depth and encoding complexity. The reduced maximum depth can decrease encoding complexity, but at the cost of visual distortion. Thus, we further explored the influence of maximum depth on visual distortion. Accordingly, we proposed an optimization formulation to control the encoding complexity of HEVC with minimal visual distortion. Based on the visual attention model, this formulation also favors subjective visual quality, by allocating more complexity resources to LCUs with greater weights. The experimental results verify the effectiveness of our approach. On one hand, in comparison with other two approaches, our approach is capable of steadily controlling the encoding complexity of HEVC with higher accuracy. On the other hand, our approach can offer superior visual quality, over other two state-of-the-art approaches.

There may exist three directions for the future work. (1) Our work in this paper only considers two simple visual attention models. Currently, with the advances in the area of visual attention modeling, much work related to the SC-C approach remains to be developed for further improving subjective visual quality. For example, one future goal of our SCC approach should include the integration of bottomup and top-down visual attention models to provide more reasonable weight maps. (2) Our work in its present form only focuses on allocating complexity resources to LCUs. Yet, there is no complexity budget scheme to adjust the complexity allocation in frame level, which may further improve the accuracy of complexity control. This provides a promising trend for the future work. (3) Many fast encoding and early termination methods are proposed for HEVC. It is quite an interesting future work to incorporate our approach with those fast encoding methods, to further decrease and control the encoding complexity of HEVC.

A Proof of Lemma 1.

The one-dimensional optimal fitting  $x_0$  for data group  $\{\Delta D_k(0)\}_{k=1}^K$  can be calculated via solving



#### →10. Conclusion (brief summary)

→11. Appendix (not important but useful)
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Similarly, we have

 $\{\Delta D_k(3)\}_{k=1}^K$ .

 $\min\{Kx_0^2 - 2\sum \Delta D_k(0)x_0 + \sum \Delta D_k(0)^2\}.$ 

value of  $x_0$  satisfying the least-square error of (18):

Taking derivative of  $x_0$  in (19), we can obtain the optimal

 $x_0 = \frac{1}{K} \sum_{k=1}^{K} \Delta D_k(0).$ 

 $\frac{1}{K}\sum_{k=1}^{K}\Delta D_{k}(1), \quad \frac{1}{K}\sum_{k=1}^{K}\Delta D_{k}(2), \text{ and } \frac{1}{K}\sum_{k=1}^{K}\Delta D_{k}(3),$ 

for the optimal fitting of  $\{\Delta D_k(1)\}_{k=1}^K$ ,  $\{\Delta D_k(2)\}_{k=1}^K$ , and

Next, we extend the optimal fitting to be two-

dimensional. Given the above optimal fitting data  $(0, \frac{1}{K} \sum_{k=1}^{K}$ 

 $\Delta D_k(0))_{(1,\frac{1}{K}\sum_{k=1}^{K}\Delta D_k^k(1)), (2,\frac{1}{K}\sum_{k=1}^{K}\Delta D_k(2)), \text{ and }$ 

 $(3, \frac{1}{K}\sum_{k=1}^{K}\Delta D_k(3))$ , we only need to fit on these four two-

dimensional data with minimal error. According to Lagrange

interpolation principle, a third-order polynomial equation is

 $\Delta D(d_t) = a_0 + a_1 d_t + a_2 d_t^2 + a_3 d_t^3, \quad d_t \in \{3, 2, 1, 0\}.$ (21)

Upon (21), coefficients  $a_0, a_1, a_2$ , and  $a_3$  can be calculated

where 0, 1, 2, 3 in the  $4 \times 4$  matrix (except the first column)

at the left hand side represent four different values of  $d_4$ .

Note that such a  $4 \times 4$  matrix is a Vandermonde matrix, and

obviously it is of full rank. Thus, there exists one and only one

solution to (22). The only solution for coefficients  $a_0, a_1, a_2$ ,

 $\begin{bmatrix} 1 & 0 & 0^2 & 0^3 \\ 1 & 1 & 1^2 & 1^3 \\ 1 & 2 & 2^2 & 2^3 \\ 1 & 3 & 3^2 & 3^3 \end{bmatrix}^{-1} \begin{bmatrix} \frac{1}{K} \sum_{k=1}^{K} \Delta D_k(0) \\ \frac{1}{K} \sum_{k=1}^{K} \Delta D_k(1) \\ \frac{1}{K} \sum_{k=1}^{K} \Delta D_k(2) \\ \frac{1}{K} \sum_{k=1}^{K} \Delta D_k(3) \end{bmatrix}$ 

Step 1 Relax. Reduce the integer programming problem

to a linear programming problem. By removing the constraint

that all variables  $\{N_p\}_{p=0}^3$  are integers, the original integer

programming problem of (14) can be relaxed to a common

B. Solving (14) with the branch-and-bound algorithm

 $\begin{bmatrix} \frac{1}{K} \sum_{k=1}^{K} \Delta D_k(0) \\ \frac{1}{K} \sum_{k=1}^{K} \Delta D_k(1) \\ \frac{1}{K} \sum_{k=1}^{K} \Delta D_k(2) \\ \frac{1}{K} \sum_{k=1}^{K} \Delta D_k(3) \end{bmatrix}$ 

able to fit the four two-dimensional data with zero error:

through solving the following matrix equation:

 $a_1$ 

 $a_2$ 

 $a_3$ 

and  $a_3$  can be obtained by solving (22),

 $= \begin{vmatrix} 1 & 0 & 0 & 0 \\ 1 & 1 & 1^2 & 1^3 \\ 1 & 2 & 2^2 & 2^3 \end{vmatrix}$ 

Finally, this lemma is proved.

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 $a_1$ 

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	TABLE IX		
BD-RATE AND BD-PSNR	COMPARISONS,	WITH HM 14.0	AS AN ANCHOR.

Target	0	ur Approach		A	pproach [7]		A	pproach [23]	
Complexity	BD-PSNR[dB]	BD-Rate %	Accuracy	BD-PSNR[dB]	BD-Rate %	Accuracy	BD-PSNR[dB]	BD-Rate %	Accuracy
80%	-0.047	0.841	2.4	-0.065	1.279	43	-0.052	1.151	3.1
60%	-0.095	2.268	0.6	-0.223	5.155	2.0	-0.206	5.034	1.4
40%	-0.572	7.301	1.0	-0.489	11.944	4.0	-0.459	10.600	4.5
20%	-0.750	17.487	5.7	-	-	15.4	-	-	10.8

(19)

(22)

(23)

linear programming problem, denoted by L. The optimal solution to  $\mathcal{L}$  can be yielded as  $(\gamma_0, \gamma_1, \gamma_2, \gamma_3)$ . If all elements of the solution are integers, the algorithm stops for outputting the final solution to (14). Otherwise, we need to record the objective value of  $(\gamma_0, \gamma_1, \gamma_2, \gamma_3)$  as  $\underline{Z}$ , the lower bound of the optimal objective value Z. Meanwhile, we can find one feasible solution to (14), the objective value of which is (20) recorded as  $\overline{Z}$ , the upper bound of Z.

Step 2 Branch. Split the solution space into smaller subspaces. Specially, one non-integer element of  $(\gamma_0, \gamma_1, \gamma_2, \gamma_3)$ needs to be chosen to construct two new constraints. Taking the example of choosing  $\gamma_1$ , the two constraints are  $N_1 \leq |\gamma_1|$ and  $N_1 \ge |\gamma_1| + 1$ , where  $|\gamma_1|$  indicates the largest integer not exceeding  $\gamma_1$ . Then, the two constraints are added to L, respectively, constructing two new subproblems  $L_1$  and  $L_2$ . Similarly, the optimal solutions to  $L_1$  and  $L_2$  are calculated by linear programming

Step 3 Bound, Calculate the upper/lower bound of each branch. Specially, there exist three cases, in terms of the solution to  $\mathcal{L}_1$  and  $\mathcal{L}_2$ .

Casel: Either  $\mathcal{L}_1$  or  $\mathcal{L}_2$  has an integer solution. If the objective value of the branch with an integer solution is smaller than  $\overline{Z}$ , then this value is recorded as a new  $\overline{Z}$ . The objective value of the other branch is compared with  $\overline{Z}$ . If it is larger than  $\overline{Z}$ , this branch is discarded or pruned. Otherwise, the algorithm moves to Step 2, in which this branch is recursively divided

Case2: Neither  $L_1$  nor  $L_2$  has an integer solution. The branch whose objective value is larger than  $\overline{Z}$  is discarded The other branch moves to Step 2 and its objective value is recorded as a new Z. If both objective values of  $L_1$  and  $L_2$ are less than  $\overline{Z}$ , the two values are compared with each other, of which the smaller one is recorded as a new  $\underline{Z}$ .

Case3: There is no solution (both integer and non-integer) to  $L_1$  or  $L_2$ . Then, the branch with no solution is discarded directly.

Steps 2 and 3 are recursively executed for  $(\gamma_0, \gamma_1, \gamma_2, \gamma_3)$ until all branches cannot be further branched. At last, the ultimate optimal solution  $\{N_p\}_{p=0}^3$  can be obtained.

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#### →12. Reference (cite others' work)

- Technical Report is a major form of communication in Engineering, it is used for reporting the results of your research, investigations, and design projects
- Technical reports are often read by the lecturers or tutors, in order to assess the students' mastery of the subjects and the ability to apply their knowledge to a practical task

PR Report Final-Introd	uction to General Engi	ineering		Project Requirement A	Assessment		
(School of General Engineering)			Team Number: A1	Project Title: Design	of a Portable Ramp for W	heelchair/Scooter	
			Student Name	Student Number	Supervisor Grade /10	Client Grade /5	Total /15
			Yangjie Cui	17351004	7		
			Yongcheng Gao	17351037	7		
			Haobo Shen	17351049	7		
Team	A1		Jingwen Zhang	17351032	8		
Members	Yangjie Cui		Tianyu Zheng	17351028	7		
-	Yongcheng Gao						
=	Haobo Shen	Strengths:					
-	Jingwen Zhang		Good teamwork. Communication between	team members.			
_	Tianyu Zheng		Suggestions for Improvement:				
Contact Person	Jingwen Zhang	- The understanding of the PR of the ramp is not completely clear.					
Supervisor	Xiaoqian Sun		English writing needs to be improved.				

Introduction to General Engineering I/II

<b>Report Sections</b>	Experimental Process
Title page	Who did the work?

<b>Report Sections</b>	<b>Experimental Process</b>
Title page	Who did the work?
Summary	What did I do in a nutshell?

<b>Report Sections</b>	Experimental Process
Title page	Who did the work?
Summary	What did I do in a nutshell?
Table of Contents	What are numbered sections?

<b>Report Sections</b>	Experimental Process
Title page	Who did the work?
Summary	What did I do in a nutshell?
Table of Contents	What are numbered sections?
Introduction	What is the problem?

<b>Report Sections</b>	Experimental Process
Title page	Who did the work?
Summary	What did I do in a nutshell?
Table of Contents	What are numbered sections?
Introduction	What is the problem?
The body of the report	How did I solve the problem? What did I find out? What does it mean?

<b>Report Sections</b>	<b>Experimental Process</b>
Title page	Who did the work?
Summary	What did I do in a nutshell?
Table of Contents	What are numbered sections?
Introduction	What is the problem?
The body of the report	How did I solve the problem? What did I find out? What does it mean?
Conclusions	Recap what did I do?

<b>Report Sections</b>	<b>Experimental Process</b>
Title page	Who did the work?
Summary	What did I do in a nutshell?
Table of Contents	What are numbered sections?
Introduction	What is the problem?
The body of the report	How did I solve the problem? What did I find out? What does it mean?
Conclusions	Recap what did I do?
Acknowledgments	Who helped me out?
References	Whose work did I refer to?
Appendix	Extra information

#### An example (one technical report):

	航空航天	大學	
PR Report Final-Introdu (School of Ge	nction to General En neral Engineering)	gineering	
Team Members	Al Yangjie Cui Yongcheng Gao Haobo Shen	-	→ 1. Title page
Contact Person Supervisor	Haobo Shen Jingwen Zhang Tianyu Zheng Jingwen Zhang Xiaoqian Sun	-	
Date	12/13/2017		

#### An example (one technical report):

#### Summary

We know the society is going aging. Influenced by the aging of society, the number of the elderly who lose the ability to walk will increase. According to statistics of a research, China has had the most electric vehicle users in the world for more than 20 years. Their travel over barriers is a difficulty. And they hope to overcome this problem. By our questionnaires, the majority of people call for a cheaper and more portable product.

This product's functions are getting across a stair conveniently in hospital or outside for the old or the disabled who need a wheelchair and people who use scooters. Indeed, there are its constrains by now. But I think people can come over them during research and finding.

To make a good product, its size, using time, cost and load-bearing are needed to be considered. And to let it adapt the market, we should take clients, users and manufacturers in consideration. But no matter how difficult it is, we will insist on our design philosophy: The quality of people's life must be improved. The environment of our life should be protected.

#### Key words:

Portable ramp, background, function, objection, market, quality of life, the environment

#### 2. Summary

#### An example (one technical report):

	→ 3. Table of Contents
Table of content	5. Table of Contents
1. LIST OF FIGURES	
2. INTRODUCTION4	
2.1 Background	
2.2 Motivation	
3. REVISED PR	
3.1 Background	
3.2 The problem	
3.3 Scope	
4. OBJECTIVES	8.2 Social Environment
5. FUNCTIONS	9. HUMAN FACTORS
6. CONSTRAINTS	10. DFX
6.1 Height7	10.1 Design for Safety9
6.2 Temperature	10.2 Design for Reliability
6.3 Load weight	10.3 Design for Maintenance
7. STAKEHOLDERS	10.4 Design for Comfort9
7.1 Clients	11. PROJECT MANAGEMENT10
7.2 Users	12. CONCLUSION
7.3 Manufacturers	Special Thanks
8. SERVICE ENVIRONMENT	13. LIST OF REFERENCE
8.1 Physical Environment	14. APPENDIX12

#### An example (one technical report):

	iction				4. Introduction
his part is t	he main introduct	ion of our project			(background/motivation
2.1 Backgrou	ind:				(backsi bana/monvation
			oday. With the aging of so		â
			wheelchair will be in dema the decline of physical, abi		
lementia morbidit	y and the rate of disabilit	y increase. Their travel i	important, too. There is or	ur market.	
			n important tool for people	to get around and its der	1
	able ramp can help peopl blems we face today. To :		l convenientiy. Id manufacture a portable i	amp that can improve or	Y
f the aged and th	disabled 's life. Also, w	e can see that we have a	big market of this product.		
2.2 Motivatio	on:				
lere is compari	son and our goal				
here are some siz	es of the ramp existing o	n the market:			
	1	2	3	4	
SIZE	800*750mm	1250*200mm	500*330*170mm	150*100*150mm	
MATER	Aluminum Alloy	Corundum and Allo	Plastic and Rubber	Plastic	
AL		У			
1. https://m.taobao.com	a				
There are two type 2. https://m.taobao.com	s of ramps on the market J	:			
1	Height Adjustable		Height Nonadjustabl	e	
DESIG N	Straight plate, has tw	o horizontal sides	triangular prism, has rough surface		

The aluminum alloy is hard so it is not easy to damage. But it is too heavy and it cannot make users travel portable. Two designs on the market are straight plane which has two horizontal sides and triangular prism which has rough surface. The first one can be small and collapsable. So, it is easy to carry. But the second one is safer, because it can be uneasily break off from the middle.

Based on the shows. We should choose more appropriate material that can overcome difficulties. And we will design a ramp that has smaller size than now to make carrying more portable. Also, we will choose reasonable design of the ramp according to its material and size.

4

#### An example (one technical report):

3.Revised PS									
This part is our problem st	atement.								
<ul> <li><u>3.1 Background</u></li> </ul>									
According to research will reach 17.17%. The a									
population of people over	4.Objective								
society, the number of the				stacles without carrying	the scooter over the obs	tacle. This			
for wheelchair will increas	product should have th a. It's easy to carry	is features for the	user's need:						
When it comes to sco vahicle users in the world	<ul> <li>a. It's easy to carry</li> <li>b. It must be safe when</li> </ul>	n naine it							
vehicle users in the world million. up 7.26% year on	c. It's environmental fi						1	market	7
is an important tool for pe	d. It's in a high quality	r <sup>-</sup>			open time	s 30	1		7
in going up the steps, whic	e. It's easy to deploy a			stakeholder	environment-				
However, only few p	<li>f. It should be conveni g. It's affordable for n</li>				friendly				
and WeChat to find out wh	g. if affordable for n h. It's easy to be maint			L		_			
reason for this is that the e 300RMB and few of them		ld have the following		7.Stakeholders					
300KMB and few of them can perfectly suit consume	-It should be easy				Here are son	me stakeho	olders who are closed	ly related to our ramm	
			should be less than !		1.Clients			9.Human factors:	
<ul> <li><u>3.2 The problem</u></li> </ul>	<ul> <li>This product mu</li> </ul>				Charter	Clients are not satisfied with the existin They are looking for practical and convenies		1. The edge of the many might be sharp. Thus, users need to pay attention to it in order to prevent being scratched. We nee to put a sign on the ramp to warm the users of the danger. 2. When folding the ramp, it is likely to clip users' fingers. Therefore, users need to be careful and follow the instructions of the ramp.	
The project aims to d	1.To meet our clis 20 cm height. Besides,		its projection for usin						
they meet on the road easil should be easy to deploy a	design on the surface of			5.Functio	5.Functions				
should be easy to deploy a thing is that it must be safe				This portable ramp is designed for		2.Users			
	ag to that it matter to that 3.3. Scope Be may it is designed. Also the same to designed that the sum that the product the odd not break if for the same to designed that the sum that the product the odd not break if for which could be university of the sum that the product the odd not break if for which could be university of the sum that the product the odd not break if for which could be university of the sum that the sum that the product the odd not break if for which could be university of the sum that the			conveniently, witho		Users who have difficulty in going up t the practicability of the ramp. They wonder degree of difficulty in cleaning the ramp can		3 Since the width of the ramp is limited, users need to pay attention to the edge of the ramp. If users slip out of the ramp may come some safety problems.	
<ul> <li><u>3.3 Scope</u></li> </ul>					ditch very easily. With this ramp, no matte				
				product should be easy to deploy and pick		-		aning the ramp can	4 Users need to place the ramp on the ground stably. If the ramp slips when it is used, users may be injured.
						3.Manufa	acturers		
						The production feasibility of the spare			
ramp must be able to bear								ph-cost to produce t	
friendly, the material of the					it is also impo	it is also important to take into account the o			
	which a child can do. I			6.Constra	ins:				
	<ul> <li>It's affordable for normal family:</li> </ul>		1. The maxim						
	1.According to our sur								
	2.By our users' need, i		clean and keep after		sperience, the general The obstacles that the r				
	(from)	objective	scale 1	and portable as pos					10.DfX
		weight	kg :		emperature of the				Some area we pay great attention to
		size projection	cm :	-	-				10.1 Design for safety:
		projection load-bearing	cm l		a from the China Mete of the highest temperate				The purpose of design for safety is to guarantee users "safety. Firstly, the ramp should not have sharp edges which might
		user-friendly			een minus 20 degrees a	0.0			scratch users. Secondly, the ramp should be anti-slippery. Thirdly, the slope of the ramp should be less than 45 degrees to
				-	um load weight (			vironmen	ensure safety. Therefore, users need less power to go up and go down slowly. Fourthly, the material of the ramp should be
		cost	yuan		2	What object	tive and su	bjective aspects 1	hard to heavy at least 200 Kg to make sure the users' safety. What's more, the sides of ramp should have vertical panels that
		service life	month		te client's request, the : take our ramp as portal	8.1. Natu	re enviro	onment	prevent the wheelchair from slipping out of the track.
	background	portable		List All of the Cor		This pro-	duct will no	t only be used indo	10.2 Design for reliability:
	⊢		- <b>II</b> -	objectives				r any other weather	The purpose of design for reliability is to guarantee the functions of the ramp under normal environment. Firstly, our
						can be stored	might not b	e smooth. Therefor	ramp should work well under all weather conditions, whether it is raining or snowing. Secondly, the ramp should work in
				objectives		8.2 Social	l enviror	nment	good condition for at least one year. Thirdly, the ramp should not break into pieces after falling down less than 1.5 meters.
						Because	the range of	av be used on the	10.3 Design for maintenance:
				DEX	Dex			than 1 minute, in c	The purpose of design for maintenance is to make it easy for users to fix some simple problems. Firstly, the ramp should
				1				oad is crowed, mak	be easy to assemble. The structure of the ramp should be as simple as possible. Secondly, the components of ramp should be
						that others on	the road w	on't get affected by	eavy to get in the market in case of users' own fix.

#### 10.4 Design for comfort:

The purpose of design for comfort is to make the users conformble when using. Firstly, to save the user' time, the ramp should not need too much time to place and fold. Secondly, for the portable, the ramp' size should be portable. Last, to reduce the vibration when using the ramp, it should have some vibration buffer when it touches the ground to guarantee the ramp would not time.

#### 5. The body of the report (Middle sections with numbered headings)

#### An example (one technical report):

#### 11.Project Management

This is the over view scheduled of our project

Week of	Scheduled activities	Deadline
23-Oct-17	Final PS	26-Oct-17
04-Dec-17	Final PR	07-Dec-17
18-Dec-17	Pre-DP	21-Dec-17
23-Apr-18 to	DR and Presentations	26-Apr-18
19-May-18		17-May-18
04-June-18	Draft Poster	07-June-18
18-June-18	Final Poster	20-June-18
18-June-18	GEDP Showcase	21-June-18
25-June-18	FDR and Final PD	28-June-18

#### 12. Conclusion:

ramp. For our main users are wheelchair and scooter users, we need to achieve some goals.

As the data from the questionnaire, our country has a large number of wheelchair and scooter users. But there is no proper ramp for them to carry to cross the obstacles or going up the steps. Our objectives should include light weight, convenient use, anti-laki surface, affordable price, good quality and durability. It will be used minity in the longith or outside to get across a static conveniently without carrying the wheelchair count the step crude).

As for the specific requirements, we will consider four main parts. Because safety is the most important priority, the ramp should not have sharp edges. And the ramp should have anti-slippary surface, proper slope degree, less power to use, good material and vertical panels. Secondly, the ramp should work well under all weather conditions and be well within one year at least. For the maintenance, the parts should be easy to find in the market and replace by users. To make it more comforbile when using, some buffers are necessary. Last but not least, the size and weight should be portable.

For the wheekhairs, it is better to know beforehand if there is someone to push the wheekhair or they need to push the wheek by themselves. The reachable range of the wheekhairs in all directions should be considered as well. Some something with the same of product, Lack the range will be fixedly to the extromonent and traffic.

#### → 6. Conclusions

→ 7. Acknowledgement

#### An example (one technical report):

Special thanks						
Name	What they have helped with					
Sun Xiaoqian	Examine the PR we have written;					
	Give advice on how to write PS and PR.					
Fu Zumru	Give advice on how to write PS and PR.					

8. References 13. List of Reference toon againg populations. http://www.sohu.com/a/116052438\_465895 http://www.chvxx.com/industry/201510/352441.html [2] About scooter: http://baiiiahao.baidu.com/s?id=1553656030627002&wfr=spider&for=pc [3] About the disabled: http://www.chyxx.com/industry/201603/396193.html http://xueshu.baidu.com/s?wd=paperuri:(f032bd9ce74aba05e6b4d67849ddcaba)&filter=sc long sign&sc ks para=q %3D%E5%85%A8%E5%9B%BD%E6%AE%8B%E7%96%BE%E4%BA%BA%BA%BA%BA%E5%8F%A3%E5% 9F%BA%E7%LA1%80%E6%95%B0%E6%8D%AE%E5%BA%93%E6%95%B0%E6%8D%AE%E5%85%86%E6% 9E%90%2A&tn=SE baidumeshu clgieupa&ie=utf-8&tsc us=18061463986851175542 Low on the quality of products of China: https://baike.baidu.com/item/%E4%B8%AD%E5%8D%8E%E4%BA%BA%E6%B0%91%E5%85%B1%E5%92%8C %E5%9B%BD%E4%BA%A7%E5%93%81%E8%B4%A8%E9%87%8F%E6%B3%95/5028597?fi=aladdin

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#### An example (one technical report):

14. Appendix		9. Appendix	
	Questionnaires o		
1. Means of transportation that a	eed the ramp ? [Si	ngle topic selection]	
Options	Summary	Percentage	
	44	75.86%	
Wheelchair			
Wheelchair Electric bike	11	18.97%	

#### 2. The formal height of obstacles ? [Single topic selection]

Options	Summary	Percentage
<10cm	7	12.07%
10cm~20cm	34	58.62%
20cm~30cm	12	20.69%
>30cm	5	8.62%
Effective respondents	58	

2. Most people think the formal height of obstacles are lower than 30cm.

#### 3. Acceptable weight ? [Single topic selection]

Options	Summary	Percentage			
0.5kg	10	17.24%			
lkg	13	22.41%			
2kg	15	25.86%			
3kg	10	17.24%			
⇒5kg	10	17.24%			
12					

#### Basic structure comparison: Journal paper vs. Technical report





Paper Sections	<b>Experimental Process</b>	<b>Report Sections</b>	
Title & Authors	Who did the work?	Title page	$\checkmark$
Abstract	What did I do in a nutshell?	Summary	$\checkmark$
-	What are the numbered sections?	Table of Contents	
Introduction	What is the problem?	Introduction	$\checkmark$
Methodology	How did I solve the problem?	The body of	
Results & Discussion	What did I find out? What does it mean?	the report	~
Conclusions	Recap what did I do?	Conclusions	$\checkmark$
Acknowledgments	Who helped me out?	Acknowledgments	$\checkmark$
References	Whose work did I refer to?	References	$\checkmark$
Appendix	Extra information	Appendix	$\checkmark$

There are high structural similarities between journal paper and technical report; good scientific writing techniques can be shared.

**Progress Report** is used for reporting the results of your research, investigations, and design projects in a certain period of time

- Daily report
- > Weekly report
- Monthly report
- Term report
- > Annual report
- > etc.

**Progress Report** should answer the following questions:

- What is your research progress and what problems are still open in the current stage?
- What is your plan to solve these problems in order to proceed further?
- Literature review
- Mathematical modelling
- Experimental design
- Manuscript writing
- Others

**Progress Report** should be submitted on time, according to the requirements of your supervisor

- You should be able to finish your task before the deadline
- It is a good practice for you to learn to avoid procrastination
- It is beneficial to summarize your research achievements regularly, so that it is easier to write the full manuscript in the future
- It is good to be aware of the research status of your peers in the same group

There are different types of scientific writing:

- Theoretical work
- Experimental work
- Observation work
- Review work
- Theoretical + application work

→The most common type
Old methods + Old research questions
Old methods + New research questions
New methods + Old research questions
New methods + New research questions

**Good practice of scientific writing** established by the Royal Society

- The importance of plain and accurate description, rather than rhetorical flourishes
- The importance of not boring reader



https://www.nature.com/scitable/ebooks/english-communication-for-scientists-14053993/writing-scientific-papers-14239285

What makes good writing?

Good writing communicates an idea clearly and effectively.

Good writing is elegant and stylish.

- Having something to say.
- Logical and clear thinking.
- A few simple, learnable rules of style

Take home message: Clear, effective writing can be learned!

#### Good scientific writing should be:

- ✓ Clear
- ✓ Simple
- ✓ Fair/Neutral
- Structured logically
- ✓ Accurate
- ✓ Objective

Avoid unnecessary details

Avoid vague or complicated sentences Avoid making assumptions or unproven statements

Avoid disordered or unclear headings

Avoid vague and ambiguous language Avoid lacking of evidence or not acknowledging others' work

[https://www2.le.ac.uk/offices/ld/resources/writing/writing-resources/science]

## Outline

#### 1.1 What is scientific writing?

#### 1.2 Why it is important?

1.3 **How** to improve it?

1.4 Where to publish it?

#### 1. Publish or Perish

Perish: pass from physical life and lose all bodily attributes and functions necessary to sustain life. Publish or Perish



"I don't mind your thinking slowly. I mind your publishing faster than you can think." (The Nobel Laureates physicist Wolfgang Pauli)



# Try to make other scholars know what you have done in the related filed.

#### 1. Publish or Perish

There are three necessary steps in useful research: the first to begin it, the second to end it and the third to publish it.

Michael Faraday (22 September 1791 – 25 August 1867) was an English scientist who contributed to the fields of electromagnetism and electrochemistry. His main discoveries include those of electromagnetic induction, diamagnetism and electrolysis.



Michael Faraday



- 2. Graduation, promotion, academic assessment
- **Graduation**: the **thesis** is required for bachelor, master and doctor degree. For doctor degree, lots of universities have regulation on the minimum number of published papers.
- **Promotion**: the papers published in the related fields are **the key** to get promoted (e.g., from assistant professors to associate professors.)
- Academic assessment: almost all **university rankings** take into account the published papers.



"Publish or Perish!" – A Call to Action



- 3. Interests
- Paper publishing is a kind of off-line conversation in the scientific fields. It enables to exchange your idea with each other.
- There is a **no way to be better** than paper publishing in exchanging your idea and research results in the research communities.
- Sometimes, you can exchange your idea in the academic conferences, but you have to travel.

- Scientific writing is often overlooked/neglected for undergraduate students, since they are overwhelmed by large amount of class time
- Undergraduate students have to write technical reports or their bachelor thesis
- Scientific writing is critical for undergraduate students in their earlier academic careers, since it is all about how to effectively communicate your research findings to other people







## Outline

- 1.1 What is scientific writing?
- 1.2 Why it is important?
- 1.3 **How** to improve it?
- 1.4 Where to publish it?

### 1.3 How to improve scientific writing

**Clear writing starts with clear thinking.** 

Once you know what you're trying to say, then pay attention to your words!

Before you start writing, ask: "What am I trying to say?"

When you finish writing, ask: "Have I said it?"

## 1.3 How to improve scientific writing

George H. Heilmeier, a former DARPA director (1975-1977), crafted a set of **questions** known as the "Heilmeier Catechism"

The purpose is to help Agency officials think through and evaluate proposed research programs.



pop & Hilmin

## 1.3 How to improve scientific writing

#### **Heilmeier Questions:**

- 1. What is the problem to be addressed?
- 2. What motivates interest? Why is it hard? Why is it important?
- 3. How is it done today, by whom, and what is wrong with it?
- 4. How do you propose to address it?
- 5. What's the new idea here, and why can we succeed now but not before?
- 6. What recent breakthroughs now make this possible?
- 7. What is the impact if successful?
- 8. Who cares and what is the quantified value if successful?
- 9. What is your plan and approach?
- 10. How will the program be organized?
- 11. What are the biggest challenges and why?
- 12. How long will it take? Why?
- 13. What are the midterm and final exams?
- 14. How will you measure progress?
- <sup>15.</sup> What investment resources are needed and what is your plan to secure them?
- 16. Computational Resources? Facilities? Space? People? Equipment? Management Support? Buy-in?
- 1. A good topic selection
- Novelty: please do not reinvent the wheel.



• **Correction:** please do not work on wrong things.



• **Contribution:** please do not make you research too simple and sometimes naïve.

1. A good topic selection

Motivation: why you do this work.

Make the reviewers & readers find interests in continuing to read your paper. An example of my research:



1. A good topic selection

Motivation: why you do this work.

### **Air Transportation in China**

2014	Global	China
Commercial Aircraft	25851	<b>2370 (</b> 10.5%)
<b>Commercial Airports</b>	3846	<b>202 (</b> ↑ <b>4.7%)</b>
Aircraft Movements	38million	7.93million (18.4%)
Passenger Volume	3.3billion	0.39billion (10.7%)
Cargo Volume	51.3million tons	5.94million (15.9%)

1. A good topic selection

Motivation: why you do this work.



1. A good topic selection

Motivation: why you do this work.

### **Air Transportation Networks**



1. A good topic selection

Motivation: why you do this work.

### **Chinese Air Navigation Route Networks**



1. A good topic selection

Motivation: why you do this work.

### **Chinese Airline Flight Networks**

CHINA SOUTHERN AIRLINES(CZ)



#### 1. A good topic selection

#### Motivation: why you do this work.

#### **Chinese Airline Flight Networks**







HAINAN AIRLINES COMPANY LIMITED(HU)



SICHUAN AIRLINES CO. LTD.(3U)



SHANDONG AIRLINES(SC)











1. A good topic selection

Motivation: why you do this work.

**Worldwide Air Navigation Route Networks** 



- 1. A good topic selection
- Motivation: why you do this work.

### Air Transportation Network Vulnerability and Threat

Extreme Weather:

- Frankfurt airport: Europe's third busiest airport, on 9<sup>th</sup> December 2012, 150 incoming and outgoing flights were cancelled because of snow storm.
- Domestic, European and Intercontinental flights were all affected at the airport



TIME 2:00 2:15 2:25 3:20	DESTINATION COPENHAGEN PARIS LONDON FRANKFURT	CANCELLED
.3:45 .4:35 .5:00 .6:25 .6:55	ZURICH BRUSSELS MILAN KYIU MOSKOW	CANCELLED CANCELLED CANCELLED CANCELLED CANCELLED CANCELLED

#### 2. How to select a good topic

The requirement of IEEE Journal of selected topics in signal processing

1. Is the paper technically sound?: Yes

why not?

2. Is the coverage of the topic sufficiently comprehensive and balanced?: Treatment somewhat unbalanced, but not seriously so.

3. How would you describe technical depth of paper?: Appropriate for the Generally Knowledgeable Individual Working in the Field or a Related Field

4. How would you rate the technical novelty of the paper?: Novel

5. How would you rate the overall organization of the paper?: Satisfactory

6. Are the title and abstract satisfactory?: Yes

2. How to select a good topic

there?

• Literature review: Where are we? Where is the destination? How can we go



- Hot topic: google, survey, special issues and conference;
- **Technical depth:** a mathematic/coding/experiment tool.

3. A reasonable overall organization

First, in **Introduction Section**, we show the background and motivation of our work.

Second, in **Literature Review and Related Work Sections**, we present the preliminary of our work, as the preparation for our study.

Third, in Method Sections, we propose our methodology in details.

Fourth, in **Experiment Section**, we verify the effectiveness of our proposed methodology.

Finally, **in Conclusion Section**, we summarize the whole paper, and also outlook the future work.

Task of writing a research paper can be daunting

Even with ground-breaking research, unless the paper is correctly written:

- at best, publication will be delayed
- at worse, never published

The goal of this lecture is to provide an overview of 'how to write a well-structured research paper for publication'



These tactics might also improve scientific writing:

- Can we tell it more like a story?
- Can we add a bit of history?
- Can we emphasize the most important aspects up high and add details later?

Paragraph organization tips:

1. Avoid a succession of loose sentences (monotonous).

2. Paragraph flow is helped by:
parallel sentence structures
logical flow of ideas *if necessary*, transition words

3. Your reader remembers the first sentence and the last sentence best. Make the last sentence memorable. Emphasis at the end!

Paragraph organization tips:

1. Avoid a succession of loose sentences (monotonous).

--Outlining and organizing can help arrange ideas.

--But, when stringing together a series of ideas, don't forget to vary sentence structure for readability.

Paragraph organization tips:

2. Paragraph flow is helped by:

parallel sentence structures logical flow of ideas *if necessary*, transition words

logical flow of ideas:

- Sequential in time
- General  $\rightarrow$  specific
- Logical arguments (if a then b; a; therefore b)

What makes stories newsworthy (developing "news judgment")?

- Impacts lots of people
- Breaking news
- Timeliness
- Prominence
- Proximity
- Conflict
- Trends ("3 things make a trend")
- Humor/Surprise

Inverted pyramid style



### Key elements of publishing

- Ethical issues
- Style and language
- Structure of paper
- Components of paper
- Article submission/journal selection
- Publisher's process/peer review

### **Ethical issues**

- Disclosure of Conflict of Interest
- Acknowledgment of funding sources
- Image manipulation guidelines
- Online submission supplemental information (datasets, videos)
- For Health Sciences
  - > Submission of a Clinical Trials to a Central Registry
  - Institutional Review Board approval

### Style and language

- Please refer to the journal's author guide for notes on style
  - Some authors write their paper with a specific journal in mind
  - Others write the paper and then adapt it to fit the style of a journal they subsequently choose
- The objective is to report your findings and conclusions clearly and concisely as possible
- If English is not your first language, find a native English speaker (if possible) to review the content and language of the paper before submitting it
- Regardless of primary language, find a colleague/editor to review the content and language of the paper

#### 4. A nice demand analysis

Video coding

I. INTRODUCTION is urgent

**R** ECENTLY, high-resolution videos and large-sized screens are flooding into the daily life of humans, bringing about perfect visual enjoyment but at the same time huge challenge on communication bandwidth. It is labored for the once-booming H.264/AVC to complete this challenge with its available coding efficiency, thus motivating the birth of a new video coding standard, called High Efficiency Video Coding (HEVC). The draft of HEVC was issued in January, 2013, and many works have been done to constantly improve its coding efficiency.

Compared to H.264/AVC, HEVC can save bit rates by about 50% with comparable video quality [1]. This eminent coding efficiency mostly benefits from the new coding tree unit (C-TU) block partitioning structure, diverse intra/inter prediction modes, and other cutting-edge techniques [2] [3]. Along with the remarkable performance of coding efficiency, the encoding complexity of HEVC increases dramatically, ranging from

Complexity reduction is necessary in video coding

9% to 502% higher than H.264/AVC [4]. However, most of multimedia-ready devices, such as portable computers, pads, and smartphones, do not have the ability to sustain such massive complexity due to their limited computational powers. Therefore, the development and research on video coding should not only fasten on enhancing the coding efficiency, but also consider the computational complexity.

Complexity control is rather important for HEVC. On one hand, with the continuous demand for videos at higher resolutions, the complexity of video coding tremendously increases from one standard to the next, with HEVC climbing the highest so far. On the other hand, the amount of multimedia devices has been growing explosively from 2007 onwards (first generation of iPhone appeared). More and more portable devices featured by encoding and decoding videos are favored by consumers, such as smartphones, pads, carPCs, and other mobile devices. However, their computational powers vary from one device to another. Thus, for better development and implementation of HEVC on various platforms with disparate computing capability, it is necessary to develop an efficient complexity control approach for HEVC.

Complexity control is quite useful when reducing the complexity of video coding.

5. An unbeaten logic

We adopt the notion of transaction from Brown [I], as modified for distributed systems by White [2], using the four-phase interpolation algorithm of Green [3]. Our work differs from White in our advanced revocation protocol, which deals with the case of priority inversion as described by Yellow [4].

#### How to write well?

#### Words:

- Reduce dead weight words and phrases (Get rid of jargon and repetition)
- Cut, cut, cut; learn to part with your words
- Be specific

#### Sentences:

- Follow: subject + verb + object (SVO)
- Use strong verbs and avoid turning verbs into nouns
- Eliminate negatives; use positive constructions instead

### Examples:

### "I would like to assert that the author should be considered to be a buffoon."

### $\rightarrow$

"The author is a buffoon."

### Examples:

"The expected prevalence of mental retardation, based on the assumption of a normal distribution of intelligence in the population, is stated to be theoretically about 2.5%.

### $\rightarrow$

"The expected prevalence of mental retardation, if intelligence is normally distributed, is 2.5%."

### Examples:

"This paper provides a review of the basic tenets of cancer biology study design, using as examples studies that illustrate the methodologic challenges or that demonstrate successful solutions to the difficulties inherent in biological research."

#### $\rightarrow$

"This paper reviews cancer biology study design, using examples that illustrate specific challenges and solutions." Hunt down and cast out all unneeded words that might slow your reader.

"Very, really, quite, basically, generally..."

 $\rightarrow$ These words seldom add anything useful. Try the sentence without them and see if it improves.

### **Dead weight phrases**

- in the event that
- in the nature of
- it has been estimated that
- it seems that
- the point I am trying to make
- what I mean to say is
- it may be argued that
- for the purpose of
- in a manner of speaking
- in a very real sense
- in my opinion
- in the case of

### Clunky phrases

Clunky phrases	<b>Equivalent</b>
• A majority of	most
• A number of	many
• Are of the same opinion	agree
• At the present moment	now
• By means of	by
Less frequently occurring	rare
• All three of the	the three
• Fewer in number	fewer
• Give rise to	cause
• In all cases	always
• In a position to	can
• In close proximity to	near
• In order to	to

## Wordy vs. Pointed

### <u>Wordy</u>

- 3 am in the morning
- absolutely spectacular
- a person who is honest
- a total of 14 birds
- biography of her life
- circle around
- close proximity
- completely unanimous
- consensus of opinion
- cooperate together
- each and every
- end result
- he is a man who

To the point **3 am** spectacular an honest person 14 birds biography circle proximity unanimous consensus cooperate each result he

### Wordy vs. Pointed

#### **Wordy**

- in spite of the fact that
- in the event that
- new innovations
- one and the same
- period of four days
- personally, I think/feel
- personal opinion
- refer back
- repeat again
- revert back
- shorter/longer in length
- had been previously found

**Pointed** although if innovations the same four days I think/feel opinion refer repeat revert shorter/longer had been found

## Wordy vs. Pointed

### <u>Wordy</u>

• small/large in size

### **Pointed**

small/large

- square/round/rectangular in shape square/round/rectangular
- surrounded on all sides
- surrounding circumstances
- the future to come
- there is no doubt that
- usual/habitual custom
- unexpected surprise

square/round/reet surrounded circumstances the future no doubt custom surprise

### Systematic review of the basics of writing
• Constantly be on the lookout for extraneous words that crop up like weeds....

- Ask yourself, is this word or phrase necessary?
- What happens if I take it out?
- Most of the time, you'll find you don't need it!

- Be vigilant and ruthless
- After investing much effort to put words on a page, we often find it hard to part with them.

But fight their seductive pull...

• Try the sentence without the extra words and see how it's better—conveys the same idea with <u>more power</u>

- Not honest
- Not important
- Does not have
- Did not remember
- Did not pay attention to
- Did not have much confidence
- Did not succeed

dishonest | trifling | lacks forgot | ignored | distrusted |

# Next time you read an article, pay attention to the following:

- 1. How many letters are in an average word?
- 2. How many words are in an average sentence?
- 3. How many sentences are in an average paragraph?

Recent research suggests that these two disorders may not be as distinct as previously was thought and the degree of overlap may be considerable.

How it should be rewritten?

Recent research suggests that these two disorders may not be as distinct as previously was thought and the degree of overlap may be considerable.

#### →Possible rewrite:

Recent research suggests that these two disorders may overlap considerably.

The study of Barrett et al. (1997) is considered to be methodologically sound. In that study, 1,000 bacteria were transformed with the novel gene.

How it should be rewritten?

The study of Barrett et al. (1997) is considered to be methodologically sound. In that study, 1,000 bacteria were transformed with the novel gene.

#### $\rightarrow$ Possible rewrite:

Using sound methods, Barret et al. (1997), transformed 1,000 bacteria with the novel gene. (active voice)

In a methodologically sound study by Barret et al. (1997), 1,000 bacteria were transformed with the novel gene. (passive voice)

There are many scientists who don't like to write.

#### →Possible rewrite:

Many scientists don't like to write.

#### Punctuation & Parallelism

Our friends the dash, colon, semicolon, and parenthesis...

Note:

A clause is a unit of grammatical organization next below the sentence in rank.

A clause has a subject and a predicate. Predicate: 谓语

**Increasing power to separate:** 

Comma Colon Dash Parentheses Semicolon Period

**Increasing formality:** 

Dash Parentheses The others (Comma, Colon, Semicolon, Period)

#### Semicolon

Indicates a pause, typically between two main clauses, that is more pronounced than that indicated by a comma.

#### **Example:**

Kennedy could be a cold and vain man, and he led a life of privilege. But he knew something about the world; he also cared about it.

#### Parenthesis

Indicates a pause, typically between two main clauses, that is more pronounced than that indicated by a comma.

 $\rightarrow$  If you remove the material within the parentheses, the main point of the sentence should not change.

#### Colon

Use a colon after an independent clause to introduce a list of items, an explanation, an amplification, or an illustrative quotation.

The colon has more effect than the comma, less power to separate than the semicolon, and more formality than the dash.

#### Dash

Use a dash to set off an abrupt break or interruption and to announce a long explanation or summary. Helps add emphasis.

A dash is a mark of separation stronger than a comma, less formal than a colon, and more relaxed than parentheses

#### **Dash-Some technical details**

- <u>HYPHEN</u> (1 unit): to connect compound words or non-range numbers; to break word that will continue on next line:
  - $\rightarrow$  little-known fact, en-dash, 723-8222
- <u>EN-DASH</u> (2 units): to indicate range (numbers, dates, time) or collaboration:
  - $\rightarrow$  pages 1 9, open 9 am 5 pm, Morris–Hayes lab, Sino–Soviet pact
  - $\rightarrow$  not a compound name of an individual, as in Catherine Zeta-Jones
- <u>EM-DASH</u> (3 units): to represent a sudden break in thought that causes an abrupt change in sentence structure:
  - $\rightarrow$  The m-dash is longer—the length of the letter m.

# Parallel Construction

**Parallel vs. Unparallel** 

Pairs of ideas—two ideas joined by "and", "or", or "but"—should be written in parallel form.

Example:

We hoped <u>to increase the response</u> and <u>to improve survival</u>. <u>Infinitive phrase</u> and <u>infinitive phrase</u>.

# Parallel Construction

#### **Unparallel vs. Parallel**

If you want to be a good doctor, you must <u>study hard</u>, <u>critically think</u> <u>about</u> the medical literature, and <u>you should be a good listener</u>.

If you want to be a good doctor you must <u>study hard</u>, <u>listen well</u>, and <u>think critically</u> about the medical literature.

If you want to be a good doctor, you must be <u>a good student</u>, <u>a good</u> <u>listener</u>, and <u>a critical thinker</u> about the medical literature.

# Parallel Construction

#### **Unparallel vs. Parallel**

This research follows four distinct phases: (1) establishing measurement instruments (2) pattern measurement (3) developing interventions and (4) the dissemination of successful interventions to other settings and institutions.

This research follows four distinct phases: (1) establishing
measurement instruments (2) measuring patterns (3) developing
interventions and (4) disseminating successful interventions to other settings and institutions.

#### Farther vs. further

Farther is used for <u>distance</u>. (think <u>far</u>) Further is used for <u>time or quantity</u>. (think <u>future</u>)

I can throw a ball *farther* than you. I am pursuing that research *further*.

#### FORWARD v. FORWARDS v. FOREWORD TOWARD v. TOWARDS

→ Some sources prefer adverbs *forward* and *toward* to *forwards* and *towards* (a bit more formal without the s; s more common in UK); foreword = preface to a book

#### Die of vs. die from

# People and animals die *of*, not from, specific diseases.

She died of a heart attack.

#### **Compliment vs. complement**

*Compliment* is to praise or to present with a token of esteem. *Complement* is to mutually complete each other.

She <u>complimented</u> his haircut. That dress <u>complements</u> your eyes.

→ In *complement*, think of *"complete-ment"* 

#### **Comprise vs. compose**

*Comprise* means to contain. "Comprise" implies a complete listing, whereas "include" may signal an incomplete listing.

#### *Compose* means to make up.

The parts compose (make up) the whole; the whole comprises (contains) the parts.

The USA comprises 50 states. (the whole contains the parts)

Fifty states <u>compose</u> the USA. (the parts make up the whole)

The USA <u>is composed of</u> 50 states. (the whole is made up of the parts)

Fifty states <u>are comprised in</u> the USA. (the parts are contained in the whole)

#### **Comprise vs. compose**

Cream and chocolate comprise chocolate sauce. Cream and chocolate compose chocolate sauce.

Chocolate sauce composes cream and chocolate.Chocolate sauce comprises cream and chocolate.

#### **Comprise vs. compose**

The dessert was comprised of cream and chocolate. The dessert was composed of cream and chocolate.

Cream and chocolate are comprised in chocolate sauce.Cream and chocolate are composed of chocolate sauce.

#### Locate vs. localize

*Locate* is to determine the position of something; to find its location.

*Localize* is to confine or fix in a particular area or part.

The police <u>located</u> the suspect at the edge of town. Iodine tends to <u>localize</u> in the thyroid.

#### They vs. their

Every one of us knows they are fallible. Every one of us knows she is fallible.

Each student pulled out their notebook. Each student pulled out his notebook.

→Do not use "they" or "their" when the antecedent is singular (but can vary gender references)

**Prevalence vs. Incidence** 

Incidence is a RATE

How many new cases develop per unit of population?

Prevalence is a PROPORTION How widespread is a given disease?

#### **Principle v. principal**

Principle is a fundamental truth or law Principal is a leader

The school's <u>principal</u> declared it a holiday. Her <u>principles</u> were impeccable.

#### **Rational v. rationale**

*Rational* is an adjective, meaning sane or logical. *Rationale* is a noun, meaning justification.

She was a rational human being. Their rationale for the move was that it would save a great deal of money.

#### Hyphenate or not hyphenate

Hyphenate multiple adjectives that modify a noun.

The ball was 21 feet in diameter. (noun) The ball had a 21-foot diameter. (adjective)

#### Quiz

# Quiz

He died of unknown causes.He died from unknown causes.
I always thought it was further to the moon. ✓ I always thought it was farther to the moon.

## ✓ She could have made it further in life.She could have made it farther in life.

Between you and I, we should have it done in no time. Between you and me, we should have it done in no time.

The medical students heard seventeen lectures about the compliment cascade.

The medical students heard seventeen lectures about the complement cascade.

The affects of the war were devastating. The effects of the war were devastating.

She was affected by the war.She was effected by the war.

### She was well-known.✓ She was well known.

✓ She was a well-known scientist.She was a well known scientist.

The previously-reported data were suspect. The previously reported data were suspect.

She was self-employed.She was self employed.

She was the best-read scientist in the lab. She was the best read scientist in the lab.

The previously-reported data were suspect. The previously reported data were suspect.

Each person is responsible for their grade. ✓ Each person is responsible for his grade.

Those colors are complementary.Those colors are complimentary.

- Is focused on a specific question(s).
- B. Covers a broad spectrum of disease or methodologic questions

 $\rightarrow$ Less is More.

Abstract and tables and figures are understandable without reading whole paper.

B. Abstract and tables and figures are understandable only with reading whole paper.

- A. Writing is in passive voice (e.g. it was found that...). Writing is in active voice (we found that...).
- C. Writing mixes active and passive voice.

- →MYTH: The passive voice is more objective.
   It's not more objective, just more vague.
   Active=claiming responsibility
- The Active Voice is direct, vigorous, natural, and informative.

- A term defined in the methods section is used again and again (a rose, a rose, a rose)
  - B. Various synonyms for a term are used to prevent reader boredom. (a rose, a flower with a thorny stem, a fragrant flower)

 $\rightarrow$  Define a term and use it consistently. Otherwise, you will confuse the reader.

A. Writing is flowery Writing is concise

 $\rightarrow$ Generally, the shorter, the better

## She doesn't take compliments well.She doesn't take complements well.

## He's not rational at that time of the day.He's not rationale at that time of the day.

Her rationale was that the drugs would help alleviate the pain.
 Her rational was that the drugs would help alleviate the pain.

### We worked on localizing proteins in the cell from their phylogenetic profiles.

✓ We worked on locating proteins in the cell from their phylogenetic profiles.

## That action violated her principles. hat action violated her principals.

Cream and chocolate comprise chocolate sauce. Cream and chocolate compose chocolate sauce.

## Chocolate sauce composes cream and chocolate. Chocolate sauce comprises cream and chocolate.

## Cream and chocolate are comprised in chocolate sauce. Cream and chocolate are composed of chocolate sauce.

The dessert was comprised of cream and chocolate. The dessert was composed of cream and chocolate.

# She accepted the compliment without a word. She accepted the complement without a word.

The sequencing of the human genome has been compared to a schoolyard brawl.
 The sequencing of the human genome has been compared with a schoolyard brawl.

## You should take some ice cream; it's complimentary.You should take some ice cream; it's complementary.

He was very complimentary of your work.He was very complementary of your work.

Red and green are complementary colors.Red and green are complimentary colors.



The 20-pound weight loss helped his self-confidence.
The 20 pound weight loss helped his self-confidence.

✓ Each person is responsible for their grade.✓ Each person is responsible for his grade.

Public trust in the peer review process and the credibility of published articles depend in part on how well conflict of interest is handled during writing, peer review, and editorial decision making.

Public trust in the peer review process and the credibility of published articles depends in part on how well conflict of interest is handled during writing, peer review, and editorial decision making.
(Public trust in the peer review process) and (the credibility of published articles) depend in part on how well conflict of interest is handled during writing, peer review, and editorial decision making.

#### $A + B \rightarrow verb plural$

Public trust (in the peer review process and the credibility of published articles) depends in part on how well conflict of interest is handled during writing, peer review, and editorial decision making.

Subject (clause item A + B)  $\rightarrow$  verb singular

#### Some Notes on Science Style

- Following are some general guidelines on preferred style for manuscripts submitted to *Science*:
- Avoid jargon; explain obscure terms and define acronyms (keep in mind that many potential readers of your work will not be specialists in your field).
- Use active voice when suitable, particularly when necessary for correct syntax, e.g.
- ✓ "To address this possibility, we constructed a  $\lambda$ Zap library . . .," "To address this possibility, a  $\lambda$ Zap library was constructed . . ."
- Write concisely, e.g.
- "even though"
  - "in spite of the fact that"

#### A note about breaking the rules...

Most writing rules are guidelines, not laws, and can be broken when the occasion calls for it.

## A note about breaking the rules...

Most writing rules are guidelines, not laws, and can be broken when the occasion calls for it.

For example, sometimes it **is** appropriate to use the passive voice.

• When the action of the sentence is more important than who did it (e.g., materials and methods)

Three liters of fluid <u>is filtered</u> through porous glass beads.

- To emphasize someone or something other than the agent that performed the action
- When the subject is unknown

## A few notes on paraphrasing...

- Use your own words
- Work from memory
- Draw your own conclusions
- Do not simply re-arrange the original author's words
- Do not mimic the original author's sentence structure

#### Never ever plagiarism!

## Organizational check-list

- Are the "what," "so what," and "why" explained in your opening paragraphs?
- Are the introductory and historical materials arranged to support the new developments?
- Are details arranged in descending order of importance?

e.g. summarize the main point prior to listing the specific examples—especially important when many background studies exist

## Organizational check-list

- Do any scientific terms need defining or clarification?
- Is the language as straightforward and energetic as you can make it?
- Are there dead weight words or phrases?
- Have you used the passive voice unnecessarily?
- Is sentence structure needlessly complex?
- Is tense consistent throughout?
- Does every paragraph have a purpose?
- Is the overall organization as logical as you can make it?
- Are there any inconsistencies?
- Does it read like a story? Or are you bored to tears reading it?

## The purpose of the discussion

- Answer the question posed in the Introduction
- Support your conclusion with details (yours, others)
- Defend your conclusion (acknowledge limits)
- Highlight the broader implications of the work
- i.e., What do my results mean and why should anyone care?

## The purpose of the discussion

#### The introduction moves from general to specific.

The discussion moves from specific to general.

## The purpose of the discussion

- 1. Key finding (answer to the question(s) asked in Intro.)
  - Supporting explanation, details (lines of evidence)
  - Possible mechanisms or pathways
  - Is this finding novel?
- 2. Key secondary findings
- 3. Context
  - Compare your results with other people's results
  - Compare your results with existing paradigms
  - Explain unexpected or surprising findings
- 4. Strengths and limitations
- 5. What's next
  - Recommended confirmatory studies ("needs to be confirmed")
  - Unanswered questions
  - Future directions
- 6. The "so what?": implicate, speculate, recommend
  - Implications of basic science findings
- 7. Strong conclusion (kicker!)

## Other things you can do to become a better writer

- Read, pay attention, and imitate.
- Talk about your research before trying to write about it.
- Develop a thesaurus habit. Search for the right word rather than settling for any old word.
- Respect your audience—try not to bore them!
- Stop waiting for "inspiration."
- Accept that writing is hard for everyone.
- Revise. Nobody gets it perfect on the first try.
- Learn how to cut ruthlessly. Never become too attached to your words.

#### About the numbers

## "1900s"

- The 1900s were from 1900 to1909 (just as the 1990s were from 1990 to 1999)
- Do you mean 1900 to 1999?
  - Use "the twentieth century"

#### About the numbers

#### "300% more" DOES NOT EQUAL "300% as much"

#### ~ AND ~

"Risk was three times greater than" (x + 3x)DOES NOT HAVE THE SAME MEANING AS"Risk was three times as great as" (3x)

## A little writing humour...

#### or "the importance of careful grammar..."

- <u>Spotted in a toilet of a London office:</u> TOILET OUT OF ORDER. PLEASE USE FLOOR BELOW
- <u>In a Laundromat:</u> AUTOMATIC WASHING MACHINES: PLEASE REMOVE ALL YOUR CLOTHES WHEN THE LIGHT GOES OUT.
- <u>In a London department store:</u> BARGAIN BASEMENT UPSTAIRS.
- In an office: WOULD THE PERSON WHO TOOK THE STEPLADDER YESTERDAY PLEASE BRING IT BACK OR FURTHER STEPS WILL BE TAKEN.

## A little writing humour...

or "the importance of careful grammar..." <u>In an office:</u> AFTER TEA BREAK STAFF SHOULD EMPTY THE TEAPOT AND STAND UPSIDE DOWN ON THE DRAINING BOARD.

Outside a secondhand shop: WE EXCHANGE ANYTHING -- BICYCLES, WASHING MACHINES, ETC. WHY NOT BRING YOUR WIFE ALONG AND GET A WONDERFUL BARGAIN?

Notice in health food shop window: CLOSED DUE TO ILLNESS.

<u>Spotted in a safari park:</u> ELEPHANTS PLEASE STAY IN YOUR CAR.

## A little writing humour...

#### or "the importance of careful grammar..."

Seen during a conference: FOR ANYONE WHO HAS CHILDREN AND DOESN'T KNOW IT, THERE IS A DAY CARE ON THE FIRST FLOOR.

#### <u>Notice in a farmer's field:</u> <u>THE FARMER ALLOWS WALKERS TO CROSS THE FIELD FOR FREE,</u> <u>BUT THE BULL CHARGES.</u>

Message on a leaflet: IF YOU CANNOT READ, THIS LEAFLET WILL TELL YOU HOW TO GET LESSONS.

On a repair shop door: WE CAN REPAIR ANYTHING. (PLEASE KNOCK HARD ON THE DOOR - THE BELL DOESN'T WORK.)

## Outline

- 1.1 What is scientific writing?
- 1.2 Why it is important?
- 1.3 **How** to improve it?
- 1.4 **Where** to publish it?

#### **Author Publishing Priorities**

• Quality and speed

Top items include

- Refereeing speed
- Refereeing standard
- Journal reputation

• Editor/board, physical quality and publication services

#### **Author VS Reader Behaviour**

#### **Author behaviour**

- Peer review essential
- Other journal functions crucial
- Wider dissemination

• Want to publish more

#### **Reader behaviour**

- Want integrated system
- Browsing is crucial
- Quality information important
- Want to read less



[www.alpsp.org]

#### **Author vs. Reader Behaviour**

#### **Reader's priorities**

- Authoritative quality articles
- Ease of access
- Rapid delivery
- Convenient format
- Linking of information clustering
- Low or no cost
- Up-to-date information
- Other

#### [www.alpsp.org]

#### **Manuscript submission**

- Select your journal carefully
- Read the aims and scope
- Think about your target audience and the level of your work do you have a realistic chance of being accepted?
- Follow the guidelines in the notes for authors and include everything they ask – it makes the editor's job easier...
- > Articles should not be submitted to more than one journal at a time

#### Author priorities for journal selection

#### Key (Determining) factors

- Impact Factor
- Reputation
- Access to the target audience
- Overall editorial standard
- Publication speed
- International coverage
- Open Access

#### Marginal (Qualifying) factors

- Experience as a referee
- Track record
- Quality and colour illustrations
- Service elements

#### **1. Journal or Conference**

- Journals are normally much more important than conferences, except computer science.
- In EE and CS fields, conferences are faster than journals. But the situation is changing.

Authors who are working in these emerging areas are cordially invited to submit their papers to this "Special Track." These papers will receive fast track review priority by an AE who are familiar with the topics. When submitting your paper in these areas, please select "Emerging Multimedia Areas" Category. When selecting EDICS, please select from 20 topics under "10 EMERGING TOPICS IN MULTIMEDIA" Our current average days from submission to first decision is around 65. We expect papers submitted to this special track will reach first decision well under 60 days. This is comparable to the review time for most multimedia conferences. I encourage everyone to consider T-MM as your first choice for submission.

Chang Wen Chen Editor-in-Chief, IEEE Trans. on Multimedia

• In chemistry and physic fields, conferences are nothing.

## Which journal?

#### A few questions to ask yourself:

- Is topic of my paper within its scope and format?
- Would it match my audience?
- Ask mentor or other senior researchers: appropriateness
- Impact Factor
- Consequences of wrong decision: time lost; failure to publish

#### 2. How to choose a nice journal

**Impact Factor (IF)**: is a measure reflecting **the average number of citations to recent articles** published in that journal.

• It is frequently used as a proxy for the **relative importance** of a journal within its field, with journals with **higher impact factors** deemed to be more important than those with lower ones.

$$IF_{y} = \frac{Citations_{y-1} + Citations_{y-2}}{Publications_{y-1} + Publications_{y-2}}$$

For example, *Nature* had an impact score of 41.456 in 2014

$$IF_{2014} = \frac{Citations_{2013} + Citations_{2012}}{Publications_{2013} + Publications_{2012}} = \frac{29753 + 41924}{860 + 869} = 41.456$$

This means that, on average, its papers published in 2012 and 2013 received roughly 41 citations each in 2014

#### 2. How to choose a nice journal

Journal Citation Reports (JCR) also includes a five-year impact factor

https://clarivate.com/products/journal-citation-reports/

JCR is an annual publication by Clarivate Analytics and it provides information about academic journals in the natural sciences and social sciences, which includes:

- 11,000+ indexed journals
- Nearly 250 disciplines
- 81 countries
- 2.2 million articles, reviews, and other source items





2. How to choose a nice journal The JCR shows rankings of journals by impact factor

Journal Data Filtered By: Selected JCR Year: 2014 Selected Editions: SCIE, SSCI

Rank	Full Journal Title	Total Cites	Impact Factor
	CA-A CANCER JOURNAL FOR CLINICIANS	18, 594	115.84
	NEW ENGLAND JOURNAL OF MEDICINE	268,652	55.873
	CHEMICAL REVIEWS	137,600	
4	LANCET	185, 361	45.217
5	NATURE REVIEWS DRUG DISCOVERY	23, 811	41.908
6	NATURE BIOTECHNOLOGY	45,986	41.514
7	NATURE	617, 363	41.456
8	Annual Review of Immunology	16,750	39.327
9	NATURE REVIEWS MOLECULAR CELL BIOLOGY	35, 928	37.806
10	NATURE REVIEWS CANCER	39,868	37.4
11	NATURE REVIEWS GENETICS	29, 388	36.978
12	NATURE MATERIALS	64,622	36.503
13	JAMA-JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION	126, 479	35.289
14	NATURE REVIEWS IMMUNOLOGY	28,938	34.985
15	Nature Nanotechnology	34, 387	34.048
	SCIENCE	557, 558	33.611
17	CHEMICAL SOCIETY REVIEWS	81,907	33. 383
18	Annual Review of Astronomy and Astrophysics	8,462	33.346
19	Nature Photonics	23, 499	32.386
20	CELL	201, 108	32.242
	NATURE METHODS	32, 342	32.072
	NATURE REVIEWS NEUROSCIENCE	32, 989	31.427
	Annual Review of Biochemistry	19, 927	30. 283
24	REVIEWS OF MODERN PHYSICS	39, 402	29.604
	NATURE GENETICS	85, 481	29.352
26	PROGRESS IN MATERIALS SCIENCE	8,475	27.417
	NATURE MEDICINE	62, 572	27.363
	PHYSIOLOGICAL REVIEWS	24, 528	27.324
	PROGRESS IN POLYMER SCIENCE	19, 454	26.932
	Nature Chemistry	16, 973	25.325
	LANCET ONCOLOGY	24, 861	24.69
	NATURE REVIEWS MICROBIOLOGY	18, 866	23.574
	CANCER CELL	27, 283	23. 523
	Annual Review of Plant Biology	16, 494	23.3
	LANCET INFECTIOUS DISEASES	13, 161	22.433
	ACCOUNTS OF CHEMICAL RESEARCH	53, 349	22.323
37	Cell Stem Cell	17,720	22.268

2. How to choose a nice journalThe JCR shows rankings ofjournals by disciplineSo far, there are **177** disciplines

#### **Relevant to my research:**

- ✓ ENGINEERING, AEROSPACE
- ✓ TRANSPORTATION SCIENCE & TECHNOLOGY
- ✓ OPERATIONS RESEARCH & MANAGEMENT SCIENCE



#### 2. How to choose a nice journal Journal list for the discipline (JCR 2014 data):

#### Aerospace, Engineering

In total, there are 27 journals



Journal	issn	IF
PROG AEROSP SCI	0376-0421	2.127
IEEE T AERO ELEC SYS	0018-9251	1.394
AIAA J	0001-1452	1.165
J GUID CONTROL DYNAM	0731-5090	1.151
AEROSP SCI TECHNOL	1270-9638	1
J AEROSPACE ENG	0893-1321	0.926
INT J SATELL COMM N	1542-0973	0.896
ACTA ASTRONAUT	0094-5765	0.816
ESA BULL-EUR SPACE	0376-4265	0.698
CHINESE J AERONAUT	1000-9361	0.689
MICROGRAVITY SCI TEC	0938-0108	0.648
INT J AEROACOUST	1475-472X	0.644
J AM HELICOPTER SOC	0002-8711	0.627
J PROPUL POWER	0748-4658	0.612
J AIRCRAFT	0021-8669	0.488
AIRCR ENG AEROSP TEC	1748-8842	0.48
J SPACECRAFT ROCKETS	0022-4650	0.474
INT J MICRO AIR VEH	1756-8293	0.471
J ASTRONAUT SCI	0021-9142	0.455
P I MECH ENG G-J AER	0954-4100	0.454
IEEE AERO EL SYS MAG	0885-8985	0.438
COSMIC RES+	0010-9525	0.348
AERONAUT J	0001-9240	0.336
T JPN SOC AERONAUT S	0549-3811	0.315
J AEROS COMP INF COM	1940-3151	0.281
INT J TURBO JET ENG	0334-0082	0.218
AEROSPACE AM	0740-722X	0.048

# 2. How to choose a nice journal Journal list for the discipline (JCR 2014 data): Transportation Science & Technology

In total, there are 32 journals



Journal	issn	IF
COMPUT-AIDED CIV INF	1093-9687	5.625
TRANSPORT RES B-METH	0191-2615	3.894
TRANSPORT RES C-EMER	0968-090X	2.82
IEEE T VEH TECHNOL	0018-9545	2.642
TRANSPORT RES A-POL	0965-8564	2.525
IEEE T INTELL TRANSP	1524-9050	2.472
TRANSPORTMETRICA B	2168-0566	2.4
TRANSPORT SCI	0041-1655	2.294
TRANSPORT RES E-LOG	1366-5545	2.193
TRANSPORTMETRICA	1812-8602	2.068
J ADV TRANSPORT	0197-6729	1.878
NETW SPAT ECON	1566-113X	1.803
TRANSPORT RES D-TR E	1361-9209	1.626
TRANSPORTATION	0049-4488	1.617
IEEE VEH TECHNOL MAG	1556-6072	1.567
INT J ENGINE RES	1468-0874	1.4
TRANSPORTMETRICA A	2324-9935	1.33
J INTELL TRANSPORT S	1547-2450	1.25
IET INTELL TRANSP SY	1751-956X	0.954
J TRANSP ENG	0733-947X	0.877
INT J AUTO TECH-KOR	1229-9138	0.821
P I MECH ENG F-J RAI	0954-4097	0.743
P I MECH ENG D-J AUT	0954-4070	0.645
TRANSPORT RES REC	0361-1981	0.556
TRANSPORT-VILNIUS	1648-4142	0.529
TRANSP LETT	1942-7867	0.41
P I CIVIL ENG-TRANSP	0965-092X	0.321
PROMET-ZAGREB	0353-5320	0.292
TRANSPORT PLAN TECHN	0308-1060	0.255
INT J VEHICLE DES	0143-3369	0.239
INT J HEAVY VEH SYST	1744-232X	0.239
ITE J	0162-8178	0.147



2. How to choose a nice journal Journal list for the discipline (JCR 2014 data):

#### Operation Research & Management Science

In total, there are 79 journals



Journal	issn	IF			
J OPER MANAG	0272-6963	4.478	QUAL RELIAB ENG INT	0748-8017	0.994
TRANSPORT RES B-METH	0191-2615	3.894	PROD PLAN CONTROL	0953-7287	0.991
OMEGA-INT J MANAGE S	0305-0483	3.19	OPTIM LETT	1862-4472	0.99
TECHNOVATION	0166-4972	2.704	COMPUT OPTIM APPL	0926-6003	0.977
MANAGE SCI	0025-1909	2.524	SORT-STAT OPER RES T	1696-2281	0.962
TRANSPORT SCI	0041-1655	2.294	OPTIM ENG	1389-4420	0.955
TRANSPORT RES E-LOG	1366-5545	2.193	MATH OPER RES	0364-765X	0.924
RELIAB ENG SYST SAFE	0951-8320	2.048	SYSTEMS ENG	1098-1241	0.923
DECIS SUPPORT SYST	0167-9236	2.036	4OR-Q J OPER RES	1619-4500	0.918
MATH PROGRAM	0025-5610	1.984	J OPER RES SOC	0160-5682	0.911
EXPERT SYST APPL	0957-4174	1.965	PAC J OPTIM	1348-9151	0.798
INT J INF TECH DECIS	0219-6220	1.89	CENT EUR J OPER RES	1435-246X	0.787
SYST CONTROL LETT	0167-6911	1.886	P I MECH ENG O-J RIS	1748-006X	0.775
J MANUF SYST	0278-6125	1.847	OPTIMIZATION	0233-1934	0.771
EUR J OPER RES	0377-2217	1.843	ТОР	1134-5764	0.766
NETW SPAT ECON	1566-113X	1.803	NETWORKS	0028-3045	0.739
PROD OPER MANAG	1059-1478	1.759	DISCRETE EVENT DYN S	0924-6703	0.667
IEEE SYST J	1932-8184	1.739	ENG ECON	0013-791X	0.647
COMPUT OPER RES	0305-0548	1.740	DISCRETE OPTIM	1572-5286	0.629
			OPER RES LETT	0167-6377	0.624
SAFETY SCI	0925-7535	1.672	J SYST ENG ELECTRON	1004-4132	0.605
INT J SYST SCI	0020-7721	1.579	STUD INFORM CONTROL	1220-1766 0257-0130	0.605
OPTIM CONTR APPL MET	0143-2087	1.535	J SYST SCI SYST ENG	1004-3756	0.566
OPER RES	0030-364X	1.5	NAV RES LOG	0894-069X	0.563
EUR J IND ENG	1751-5254	1.5	MATH METHOD OPER RES		0.505
M&SOM-MANUF SERV OP	1523-4614	1.45	J IND MANAG OPTIM	1547-5816	0.535
FLEX SERV MANUF J	1936-6582	1.439	APPL STOCH MODEL BUS	1524-1904	0.530
J OPTIMIZ THEORY APP	0022-3239	1.406	CONCURRENT ENG-RES A	1063-293X	0.531
J GLOBAL OPTIM	0925-5001	1.355	INT J TECHNOL MANAGE	0267-5730	0.492
INT J PROD RES	0020-7543	1.323	INT T OPER RES	0969-6016	0.481
J QUAL TECHNOL	0022-4065	1.271	IMA J MANAG MATH	1471-678X	0.471
ENG OPTIMIZ	0305-215X	1.23	INTERFACES	0092-2102	0.443
OPTIM METHOD SOFTW	1055-6788	1.21	INFOR	0315-5986	0.41
J SCHEDULING	1094-6136	1.186	J SIMUL	1747-7778	0.383
INFORMS J COMPUT	1091-9856	1.12	QUAL TECHNOL QUANT M	1684-3703	0.339
ANN OPER RES	0254-5330	1.103	RAIRO-OPER RES	0399-0559	0.333
OR SPECTRUM	0171-6468	1.09	PROBAB ENG INFORM SC	0269-9648	0.328
IIE TRANS	0740-817X	1.064	MIL OPER RES	0275-5823	0.312
INT J COMPUT INTEG M	0951-192X	1.019	ASIA PAC J OPER RES	0217-5959	0.22
FUZZY OPTIM DECIS MA	1568-4539	1			



2. How to choose a nice journal One top journal in transportation field:

#### **Transportation Research Part B:** Methodological

https://www.journals.elsevier.com/tran sportation-research-part-bmethodological/

TRANSPORTATION RESEARCH

ISSN: 0191-2615

Impact Factor: 3.769 <sup>(1)</sup>

(SNIP): 2.433 0

5-Year Impact Factor: 4.822 ①

Source Normalized Impact per Paper

SCImago Journal Rank (SJR): 2.742 <sup>(1)</sup>

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Home > Journals > Transportation Research Part B: Methodological

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This journal is now partnering with Heliyon, an open access journal from Elsevier publishing quality peer reviewed research across all disciplines. Partner journals provide authors with an easy route to transfer their research to Heliyon. >Learn more at Heliyon.com

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Transportation Research Part B: Methodological

An International Journal

> Supports Open Access

Editor in Chief: Hai Yang

Transportation Research: Part B publishes papers on all methodological aspects of the subject, particularly those that require mathematical analysis. The general theme of the journal is the development and solution of problems that are adequately motivated to deal with important aspects of the design...

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Modelling bus bunching and holding control with vehicle overtaking and distributed passenger boarding behaviour Weitiao Wu | Ronghui Liu | ...

Optimal design of autonomous vehicle zones in transportation networks Zhibin

Crowd behaviour and motion: Empirical methods Milad Haghani | Majid Sarvi

#### READ ALL 100 æ Drivers slower to respond to emergencies ABOUT IT Safety Research

🔰 in 🗟 🖂

- 2. How to choose a nice journal
- Reputation vs. ranking
  - ✓ Transportation Science
  - Transportation Research Part B: Methodological
  - ✓ Transportation Research Part C: Emerging Technologies
  - ✓ Transportation Research Part E: Logistics and Review
  - ✓ IEEE Transactions on Intelligent Transportation Systems
  - ✓ Transportation Research Part A: Policy
  - Transportation Research Part D: Environmental
  - ✓ Networks and Spatial Economics
  - ✓ Transportmetrica A/B
  - ✓ Journal of Advanced Transportation

2. How to choose a nice journal

Author-level metrics: are citation metrics that measure the bibliometric impact of individual authors, researchers, academics, and scholars.

A prime example: Google Scholar H-index



**h-index**: The largest number h such that h publications have at least h citations

i10-index: The number of publications with at least 10 citations.

#### **Traditional vs. Open-Access Journals**

#### **Traditional vs. Open-Access Journals**

• **Traditionally-published journals** are mostly funded through subscriptions or advertising



In the OA journals, scholarly journals make their content freely available online to all readers without needing a subscription or other fees. In general, the cost of publication is paid by you (the author)

These are journals that give authors the choice to publish in a traditional format or an OA format for an article processing fee
#### **Traditional vs. Open-Access Journals**

Pros and cons of traditional vs. Open-Access publishing

#### **Free to You vs Pay to Publish, but free to your readers**

Check if you **have available funding** before you submitting your papers and be prepared to pay!

#### **Only Accessible to Subscribers vs High Visibility**

High visibility  $\rightarrow$  may lead to higher **number of citations**, which is one indicator of a scientist's productivity and the impact of their research

# A Long 'Paper Waiting' vs Speed of Publication OA journals have shorter time between acceptance and publication

#### **Question: Which one I should choose?**

#### Traditional vs. Open-Access Journals Answer:



It depends on the author, their goals, the topic of their research, their financial situation and the standpoint in their career.

Therefore, the question is not which one is better, rather it is which publication format is best for your particular paper at a particular time.

#### However, keep in mind that each coin has two sides!

#### Criticisms on Impact Factor

- Debate on the validity of the impact factor as a measure of journal importance and the effect of policies that editors may adopt to boost their impact factor
  - For instance, the editors might force you to cite at least 5 papers from his journal
- The effect of the impact factor on behavior of scholars, editors and other stakeholders
- Invalided comparisons across disciplines or within different fields of research of one discipline

We need a democratic discussion on the social value of research assessment and the growing precariousness of scientific careers

#### **Conference vs. Journal**

- 3. How to choose a nice conference
- > You need to check:

Reputation, ranking, keynote speakers, acceptance rate, paper length

> Reasons to attend conferences:

Meet experts & influencers face to face Perfect network opportunities Learning in a new space Break out of your comfort zone





Conference provide a unique convergence of networking, learning, and fun into a single package. A good conference forces you to grow and challenge yourself.

#### But, attending conferences is not for free!

You have to

- Spend time & money on traveling
- Pay the conference registration fee
  - Often you need to submit & present your paper, since in general conferences have the "no paper, no go" policy

#### Learn to make trade-offs among time & money & networking

- 3. How to choose a nice conference
- A ranking from Microsoft Research, and there are a lot of other rankings...

#### Top conferences in computer vision

1-46 of 46 results

All Years

#### Conferences Publications Citation Ŧ CVPR - Computer Vision and Pattern Recognition 7712 169884 ICCV - International Conference on Computer Vision 2968 88067 ECCV - European Conference on Computer Vision 2145 58805 FGR - IEEE International Conference on Automatic Face and Gesture Recognition 972 20270 BMVC - British Machine Vision Conference 1522 16788 WACV - Workshop on Applications of Computer Vision 755 7657 ACCV - Asian Conference on Computer Vision 1213 6123 3DIM - International Conference on 3-D Imaging and Modeling 349 4451 3DPVT - 3D Data Processing Visualization and Transmission 422 3086 Scale-Space - Scale-Space Theories in Computer Vision 386 3073 ICVS - International Conference on Computer Vision Systems 293 2764 CVRMed - Computer Vision, Virtual Reality and Robotics in Medicine 164 2369 ICARCV - International Conference on Control, Automation, Robotics and Vision 2026 2358 EMMCVPR - Energy Minimization Methods in Computer Vision and Pattern Recognition 255 2090 DGCI - Discrete Geometry for Computer Imagery 462 1973 ICCV Workshops 27 1394 CRV - Canadian Conference on Computer and Robot Vision 560 1376 ISVC - International Symposium on Visual Computing 1101 1355

What you need to know about the peer review process:

- Most journal editors will make an initial decision on a paper to review or to reject
- Most editors appoint two referees
- Refereeing speed varies tremendously between journals
- Authors should receive a decision of Accept, Accept with Revision (Minor or Major), or Reject
- > If a paper is rejected, most editors will write to you explaining their decision
- After rejection, authors have the option of submitting the paper to another journal - editor's suggestions should be addressed

### **Overview of Peer Review Process**



Some additional documents for the submission process:

- Cover letter
- Highlight
- A list of suggested reviewers
- Manuscript without author information
- Manuscript with author information

#### > Cover letter sample:

Dear Editors,

Hereby we submit the manuscript XXX for your journal XXX.

Explain why do you think your work fits this journal?

Emphasize what are your novel contributions of your manuscript?

We hope to make a significant contribution to your journal XXX. Thank you very much.

Best Regards XXX on behalf of all authors

#### > Highlights sample:

- Bibliometric analysis and graphical mapping of the evolution of the air transport/JATM knowledge body.
- CiteSpace visualization of 1483 JATM papers from 2001 to Covid-19 outbreak (end of 2019).
- Pandemics and economic crises not dominant in influencing JATM literature neither in frequency nor in impact.
- Recovery, crisis and disruption are important key words in JATM papers but no dominant authors nor institutions.
- Recent JATM pandemic and recovery management literature can assist with transitioning out of COVID-19 world.

[https://www.sciencedirect.com/science/article/pii/S0969699720304993]

#### Confirming submission sample:

\*This is an automated message.\*

Manuscript Number: XXX

XXX

Dear Dr Sun,

We have received the above referenced manuscript you submitted to Transportation Research Part B.

To track the status of your manuscript, please log in as an author at https://www.editorialmanager.com/trb/, and navigate to the "Manuscript Being Processed" folder.

Thank you for submitting your manuscript to this journal.

Kind regards,

Transportation Research Part B

#### Confirming submission sample:

\*This is an automated message.\*

Dear Dr Sun,

Your above referenced submission has been assigned **a manuscript number**: XXX.

To track the status of your manuscript, please log in as an author at https://www.editorialmanager.com/jatm/, and navigate to the "**Submissions Being Processed**" folder.

Thank you for submitting your work to this journal.

Kind regards,

Journal of Air Transport Management

#### ➤ Desk rejection sample ⊗⊗

Dear Dr. Author,

Thank you for submitting your manuscript, which was very interesting and I think with some work will be a valuable contribution to the literature. I was especially intrigued with your approach to distinguishing host-choice errors from oligophagy, which is a problem very much in need of a solution. However, I don't think our journal is the right place for the manuscript you've written; I think it might reach its audience better in an entomology or plant-insect interactions journal. I'm returning it to you without further review, therefore, in order not to delay its eventual publication. Good luck!

Sincerely,

Dr. Editor

#### Sample for your manuscript has been sent for review

Dear Dr. Sun,

I am currently identifying and contacting reviewers who are acknowledged experts in the field. Since peer review is a voluntary service it can take time to find reviewers who are both qualified and available. While reviewers are being contacted, the status of your manuscript will appear in EVISE® as 'Reviewer Invited'.

Once a reviewer agrees to review your manuscript, the status will change to 'Under Review'. When I have received the required number of expert reviews, the status will change to 'Ready for Decision' while I evaluate the reviews before making a decision on your manuscript.

To track the status of your manuscript, please log into EVISE® and go to 'My Submissions' via:

http://www.evise.com/evise/faces/pages/navigation/NavController.jspx?JRNL\_ACR=TRB Kind regards,

Transportation Research Part B

#### ➤ Decision on submission sample ⊗

Dear Dr. Sun,

Thank you for submitting your manuscript to Transportation Research Part E: Logistics and Transportation Review. Your manuscript review is handled by one EAB member. The EAB member has completed your manuscript review. I regret to inform you that both reviewers and EAB member have advised against publishing your manuscript, and I concur with their recommendations after going through their review reports and EAB member's assessment report. Hence, we must therefore **decline** your manuscript. However, you are encouraged to re-submit your manuscript with a detailed response report provided that you can well address the critical comments.

Please refer to the comments listed at the end of this letter for details of why I reached this decision.

We appreciate your submitting your manuscript to this journal and for giving us the opportunity to consider your work.

Kind regards,

Editor In Chief

Transportation Research Part B

#### > Decision on submission sample ③

Dear Dr Sun,

Thank you for submitting your manuscript to Transportation Research Part B. I have completed the review of your manuscript and a summary is appended below. All the reviewers recommend reconsideration of your paper following a **major revision**. I invite you to resubmit your manuscript after addressing all the reviewers' comments very carefully and in full.

When resubmitting your manuscript, please carefully consider all issues mentioned in the reviewers' comments, outline every change made point by point, and provide suitable rebuttals for any comments not addressed.

To submit your revised manuscript, please log in as an author at https://www.editorialmanager.com/trb/, and navigate to the "Submissions Needing Revision" folder.

Transportation Research Part B values your contribution and I look forward to receiving your revised manuscript by **Jul 14, 2020**.

Kind regards, Associate Editor, Transportation Research Part B

#### > Author Response to the Comments of Editors and Reviewers

Dear Dr. Editor,

Enclosed is the revised paper (changes are highlighted), "Title of the manuscript". We appreciate your helpful comments and those of the reviewers.

We have made revisions based on the comments/suggestions of Reviewers I and II. The comments of each reviewer are numbered below, with our response (clarifications and changes) following.

#### > Author Response to the Comments of Editors and Reviewers

Reviewer I:

1. There is little discussion of XXX

We agree with Reviewers I and II that the section on *XXX* was too abbreviated. Therefore, we have added a paragraph that highlights *XXX* (paragraph *33*).

2. Could you comment on XXX

We have added a sentence to paragraph 9 in Methods/Materials that comments on *XXX* 

Thank you again for your helpful comments. Please let us know if any other revisions are required.

Regards,

Corresponding Author

#### > Letter of Acceptance sample

I am very pleased to inform you that your manuscript has been accepted for publication in the IEEE Transactions on CSVT. Instructions for preparing the final manuscript and supporting documents are available at URL:http://tcsvt.polito.it/accept.html

Please upload all necessary items before July 10, 2020. Postponement will cause your paper to be removed from the list awaiting publication. Payment of overlength charge for papers more than nine (9) pages long in twocolumn format is mandatory. Transactions Papers are strictly limited to fourteen (14) pages in two-column format.

I would like to remind you that references are very important in journal articles. I therefore invite you to update your references with the most recently available citations.

#### > Letter of Acceptance sample-continued

The following wording must appear on the first page of all PDF's when a final paper is submitted:

Copyright (c) 2011 IEEE. Personal use of this material is permitted. However, permission to use this material for any other purposes must be obtained from the IEEE by sending an email to pubs-permissions@ieee.org.

Thank you for contributing to the Transactions on CSVT.

Hamid Gharavi Editor-in-Chief IEEE Transactions on Circuits and Systems for Video Technology

#### > Letter of Proof sample

Dear Dr. XXX,

The proof for your article, XXX, is ready for your review. Please connect to the following URL to retrieve your proof:

URL: XXX

If you have trouble accessing your proof site, please make sure that your browser's security setting utilizes 128-bit SSL as it is necessary for access to your proof. If you have any problems or questions regarding this proof, please contact your IEEE staff editor by replying to this message.

XXX Associate Editor, Transactions on XXX

#### > Letter of Inquiry sample

Dear Dr. XXX,

Recently, we checked the status of our manuscript "XXX" (No. XXX) submitted to SMCC on March 22, 2020, and found that the review record remained "Awaiting Reviewer Assignment". We are sending this e-mail to inquiry the status of the manuscript. Your acknowledgement will be highly appreciated.

Thank you.

Best regards, XXX on behalf of all authors

### Do original and innovative research

Editors and reviewers are looking for **original and innovative research** that will add to the field of study; keys are:

- For research-based papers, ensure that you have enough numbers to justify sound statistical conclusions
- For a larger study, it may be better to produce one important research paper, rather than a number of average incremental papers

#### Proofread before Submitting

- ✓ Are terms used consistently throughout?
- ✓ Do numbers in abstract match numbers in text and tables?
- ✓ Do citations in text match references?
- Are Syntax and Grammar acceptable?

### You need to know about reviewers

- In general, they are very busy, which means that they only have limited time to read your
  Title+Abstract+Conclusions+Figures/Tables
- If these are not convincing, the submission of your manuscript is very likely to be killed ☺
- If these are interesting, the reviewers will go to your Methodology+Experimental Results, to see if there is anything significant

<u>One hint: Do cite state-of-the-art references,</u> <u>also potential reviewers' own research papers</u>



### Getting the Reviews of Your Paper

- > "The reviewer is always right." (whether they are or not!)
- > Don't respond quickly. Digest reviews.

### If your paper was rejected...

- Was it sent out for review? If not, consider changing type of journal
- If reviews don't suggest changes, send it out quickly to another journal
- The 3 journal rule.



We regret to inform you that your paper has not been accepted

#### **Please remember the reviewer is a typical reader**

- Accept
- Minor Revision
- Major Revision
- Reject



#### This might happen as well :-)

• Italian-American physicist, Enrico Fermi, his paper "Beta Radioactivity Theory" was rejected by 《Nature》, but this work make him won the 1938 Nobel Prize in Physics!

The theory is too far away from reality, the readers won't be interested





So far, there are **39** papers were rejected from prestige journals, but they won Nobel Prizes in the end !

编号	科学家	被忍的研究	拿诺奖情况	肇事期刊
1	维尔施泰特	叶绿素等植物色素	1915年化学奖	Berichte of the German Chemical Society
2	费米	弱相互作用理论	1933年物理奖	Nature
3	克雷布斯	柠檬酸循环	1937年生理学或医学奖	Nature
4	蒂塞利乌斯	蛋白酶的电泳	1948年化学奖	未知的生化期刊
5	汤川秀树	介子	1949年物理奖	Nature, Physical Review
6	切伦科夫	切伦科夫辐射	1958年物理奖	Nature
7	奥乔亚	RNA的合成机制	1959年生理学或医学奖	J. Am. Chem. Soc.
8	科恩伯格	DNA的酷合成	1959年生理学或医学奖	Journal of Biological Chemistry
9	伯内特	抗体反应	1960年生理学或医学奖	英国某科学期刊
10	魏格纳	物理学中的基本对称性	1963年物理奖	American Journal of Mathematics
11	汤斯	发明激光	1964年物理奖	Physical Review Letters
12	盖尔曼	强相互作用理论	1969年物理奖	Physical Review
13	利普斯科姆	硼烷结构的研究	1976年化学奖	J. Am. Chem. Soc.
14	布隆伯格	急性病毒性肝炎的抗体	1976年生理学或医学奖	未知
15	雅洛	放射免疫疗法	1977年生理学或医学奖	Science
16	布朗	有机硼烷的合成	1979年化学奖	J. Am. Chem. Soc.
17	陶布	金属配位化合物电子转移	1983年化学奖	Chemical Review
18	钱德拉塞卡	恒星变黑洞的质量极限	1983年物理奖	愛丁頓(不是一本期刊)
19	福勒	元素的核合成机制	1983年物理奖	未知
20	米尔斯坦	人体白细胞分化抗原	1984年生理学或医学奖	Journal of Experimental Medicine
21	冯・克利吉	量子霍尔效应	1985年物理奖	Physical Review Letters (先拒后发)
22	波拉尼	红外激光器的相关研究	1986年化学奖	Physical Review Letters
23	科恩	生长因子	1986年生理学或医学奖	未知
24	宾宁和罗雷尔	原子力显微镜	1986年物理奖	未知
25	米歇尔	光合作用反应中心的三维	1988年化学奖	Nature
26	切赫	RNA的生物催化作用	1989年化学奖	Nature (先拒后发)
27	恩斯特	磁共振	1991年物理奖	Journal of Chemical Physics拒了两次
28	穆利斯	PCR技术	1993年化学奖	Nature, Science
29	史密斯	定点突变	1993年化学奖	Cell
30	李、奥谢罗夫和 理查德森	He-3超流现象	1993年物理奖	Physical Review Letter
31	罗德贝尔	高度敏感的腺苷酸环化酶	1994年生理学或医学奖	Analytical Biochemistry
32	博耶	ATP	1997年化学奖	Journal of Biological Chemistry
33	伏契哥特	一氧化氮的生理学作用	1998年生理学或医学奖	Nature (先拒后发)
34	克勒默	半导体	2000年物理奖	Applied Physics Letters
35	哈特韦尔	细胞周期中的关键调节因	2001年生理学或医学奖	Nature
36	玻色	量子统计	2001年相关实验获得物理奖	Philosophical magazine
37	劳特伯	磁共振成像	2003年生理学或医学奖	Nature(先拒后发)
38	丹・谢赫特曼	准晶体	2011年化学奖	Physical Review Letter
39	希格斯	希格斯玻色子	2013年物理奖	Physics Letters

- So, one message is that don't get frustrated if your manuscript is rejected somewhere, you need to go on working on the manuscript and resubmitting your work to somewhere else until it is accepted!
- All is not gold that glitters, but gold will glitter forever 闪光的东西并不一定是金子,但是金子总会发光的

#### Peer Review

#### If you are the reviewer...



#### Peer Review

- Assume there is some poor graduate student on the other end who did all the work, and whose confidence and career depend on your critique.
- Tone matters!
  - E.g. "The authors should delete table 5; not only is it completely irrelevant, but it also reveals their utter lack of statistical understanding."
  - vs. "Table 5 contains unnecessary information (for example...), and a Pearson's correlation coefficient may not be appropriate here. The authors should consider revising or omitting the table."
- Avoid criticizing the authors! Criticize the work.
- Avoid generalizations; point out specific errors.
- Use positive instead of negative language where possible:
   "The paper is poorly written." vs. "The writing and presentation could be improved. For example..."
- Avoid "lecturing" to the authors.

#### 1. Scan the abstract.

#### 2. Jump to the data: review the tables and figures first.

Draw your own conclusions.

Do the tables and figures stand on their own?

Are there any obvious statistical errors?

Is there repetitive information?

#### 3. Read the paper once through.

Do the authors conclusions match their data?

Is the paper clearly written, or did you struggle to get through it? You should not have to struggle!

Is the length of the paper justified given the amount of new information that the data provide?

#### 4. Read the introduction carefully.

- Is it three paragraphs long (or close)? Does it roughly follow: known-->unknown-->research question/hypothesis?
- Is there detailed information about *what was done* that belongs in the methods?
- Is there information about *what was found?* If so, it should be moved to the results.
- Is there distracting information about previous studies or mechanisms that are not directly relevant to the hypothesis being tested. If so, it should be moved to the discussion.
- Do the authors tell you what gaps in the literature they are trying to fill in?

#### 5. Read the methods carefully.

- Scan this section to find answers to your questions about the data.
- Were things measured objectively or subjectively? What instruments were used?
- Are there flaws in the study design, such as no control group?
- Read the statistics section carefully.

#### 6. Read the results carefully.

- Read this section with the tables and figures in front of you.
- Does each section roughly correspond to one table or figure?
- Do the authors summarize the main trends and themes from the table, or do they just repeat what is in the tables?
- If there are graphs, do the authors give precise numerical values in the text if it is not given in the graph?
- Are the authors honest or do they try to draw your eye to what they want you to see??
- Do the authors over-interpret statistical significance, by ignoring the fact that the magnitude is small or by ignoring the fact that they have done multiple subgroup analyses?
- Is this section unnecessarily long?

#### 7. Look at each table and figure.

- Did the authors choose the correct statistics?
- Is there repetitive information in a single table, such as both p-values and standard errors?
- Are there multiple tables or figures that tell the same story? For example, Table 2 gives parameter estimates from a logistic regression model and Table 3 gives odds ratios from the same model and Figure 1 plots the odds ratio confidence intervals. Or Table 1 gives the mean values for two groups and indicates statistical significance from a ttest and Table 2 gives confidence intervals for the differences in means for the same data.
- Did the authors adjust for confounding and consider interactions?
- Is there evidence of data dredging or purposefully omitting data?
- Are any graphs misleading, e.g. through manipulation of area or axes?
- Is the "treatment" group always compared with a proper control/placebo group?
- Are there inconsistencies in the data they present from one table to the next?
- Did the authors make transcribing errors when going from the data in tables/results to the abstract?

#### 8. Read the discussion carefully.

- Does the first paragraph succinctly and clearly tell you what was found and what is new?
- Are the authors' conclusions justified or are they overreaching?
- Do they clearly distinguish hypothesis-driven conclusions and exploratory conclusions?
- Is the writing clear and to the point (active voice!)? Is there some sense of order and structure or are they just rambling on aimlessly?
- Could the discussion be shortened?
- Did they address the limitations you care about? (as opposed to any old irrelevant limitations that they threw in just to have some)
- Are the references that they cite current?
- Have they omitted key references?

#### Comments to authors:

#### 1. Start with a one-paragraph "general overview."

- State what you think is the major finding and importance of the work. Give 2-3 positive, encouraging statements about the work. If the methods are crap, is the writing nice, for example? Is the research question particularly interesting or novel? (E.g., "This is an interesting manuscript, with several strengths." "The authors should be commended for ..." "The finding that .... is important.)
- State 1-2 major limitations (if there are any) to the study design, writing/presentation, or conclusions. (E.g., "The study is limited because there is no control group." "The overall writing or presentation needs improvement." "The authors may have over-stated their findings." "The paper provides only weak evidence for its conclusions." "The study is exploratory, not hypothesisdriven.")
- **Do** <u>not</u> tell the authors your overall recommendation (rejection, acceptance).

Comments to authors:

2. In a *numbered* list, give 5-15 specific criticisms/suggestions for revision. The number will often correspond to your recommendation (give the most if you are recommending "opportunity for revision.")

- Point out specific mistakes.
- List the issues that you found in your review.
- Give specific recommendations for revision.

Comments to editors:

1. Fill out journal "grading sheet."

 Impact of Research

 TOP 10%
 \_\_\_\_\_

 TOP 25%
 \_\_\_\_\_

 Top 50%
 \_\_\_\_\_

 Bottom 50%
 \_\_\_\_\_

 Bottom 25%
 \_\_\_\_\_

 Bottom 10%
 \_\_\_\_\_

Originality of Results... Methodology and Data Quality... OVERALL MANUSCRIPT RANK...

#### Comments to editors:

1. Fill out journal "grading sheet."

2. Choose your recommendation: Reject (~33%)
Reject with opportunity to revise (~33%)
Accept with minor revision (~33%)
Accept

3. Give a succinct overall statement to the editors that justifies your ranking. State the papers major strengths and weakness. (you can borrow material from your comments to the authors.)

The first one you do will take a long time. You will get progressively faster at these as you go along.

Review unto others as you would want to be reviewed!

# REVIEWER $\neq$ EDITOR!!!

- Do not be spend your time nit-picking. Focus on bigpicture issues.
- If the manuscript has a lot of copy-editing errors, point this out in a general way and give one or two examples, e.g. "The manuscript contains typos, such as..."

### 工欲善其事,必先利其器

### Outline

1 Writing tools1.1 LaTeX1.2 Word

# 1 Writing tools

1. In general, the pdf file is required for almost all journals and conferences.

Portable Document Format (PDF) is a file format used to present documents in a manner independent of application software, hardware and operating systems.



#### 2. To produce pdf file, laTex/tex and word are preferred.

LaTeX is a word processor and a document markup language. It is distinguished from typical word processors such as **Microsoft Word** and **Apple Pages** in that the writer uses **plain text** as opposed to **formatted text**, relying on markup tagging conventions to define the general structure of a document (such as article, book, and letter), to stylize text throughout a document (such as bold and italic), and to add citations and cross-referencing.



## 1 Writing tools

#### Requirement of IEEE (TCSVT)

#### A. Submission of a Transactions Paper

- Only electronic submissions will be considered. Detailed instructions are posted on the website of the TRANSACTIONS at http://tcsvt.polito.it. Prospective authors should be familiar with the General Information for Authors posted on the TRANSACTIONS website. In case of hardship, an author may ask for help by sending an e-mail to tcsvt@tcad.polito.it
- All papers must be clearly written and well organized. The manuscript should state the significance of the problem in the Introduction. The paper should be motivated by a clear discussion of the relationship of the paper to the most relevant prior work.
- 3. The total length of a manuscript cannot exceed fourteen (14) pages when printed using IEEE two-column format including figures (approximately 42 double-spaced typewritten pages of 8 1/2 11). (Note: Over-length charges begin with the 10th page. See details below.) The style files for LaTeX and Word can be downloaded from <a href="http://www.ieee.org/pubs/authors.html">http://www.ieee.org/pubs/authors.html</a>. The final submission format must be PDF.
- 4. Originals for the illustrations should be ready to be submitted immediately upon acceptance of the TRANSACTIONS Paper.
- 5. See instructions on the web site for completing the IEEE copyright form for the manuscript.
- 6. If the manuscript has been presented, published, or submitted for publication elsewhere, please so inform the Editor-in-Chief in the comment form. Our primary objective is to publish technical material not available elsewhere, but on occasion we publish papers of unusual merit which have appeared or will appear before other audiences.

- ✓ Installation
- Starting a document
- ✓ Sections
- Equations
- ✓ Figures
- ✓ Tables
- Hyperlinks
- ✓ More
- Bibliography Management
- ✓ Resources



## 1.1 LaTeX-Installation

#### TEX Live Installation

A complete TEX system to be installed to disk. Home page: <u>http://tug.org/texlive/</u>



First stage of Windows .exe installer

### 1.1 LaTeX-Installation

#### **TEX Live Installation**



## 1.1 LaTex

\*

#### • A small example:

Cartesian closed categories and the price of eggs Jane Doe September 1994 Hello world!

#### In most word processing systems, you have to decide:

- Times New Roman 18pts for title
- Times Italic 12pts for author etc.
- Center the header
- Page width

. . . . . .

\*An introduction to LaTeX <u>https://www.latex-project.org/about/</u>

- LaTeX's basic ideas:
- Leave document design to document designers
- Let authors get on with writing documents

```
\documentclass{article} %This document is an article.
\title{Cartesian closed categories and the price of
eggs} % Its title is Cartesian closed categories and the price of eggs.
\author{Jane Doe} %Its author is Jane Doe.
\date{September 1994} %It was written in September 1994.
\begin{document}
    \maketitle
    Hello world! %The document consists of a title followed by the text
    Hello world!
\end{document}
```

#### Laws on MS Word

1. Likelihood of a crash is directly proportional to the importance of a document.

2. Likelihood of a crash is inversely proportional to the time left before its deadline.

3. likelihood of a crash is directly proportional to the duration since you last saved.

4. likelihood of you throwing your computer out of the window is directly proportional to the number of times Clippy pops up.

Mic Mic	rosoft Office Word	Document				Share	Anthony Tosie	Sign out	?
	Microsoft Office Word 已停止工作 Windows 可以联机检查该问题的解决方案,并尝试恢复您的信息。	t you want to do €E +E ■ Ĵ≣ + ▶₹ ¶4	OPE AaBbCc Normal	N IN WORD AaBbCc No Spacing	AaBbC( Heading 1	AaBbCc		Pind	
	→ 联机检查解决方案并关闭该程序	ragraph			Styles		er when we used to ers together? et	Editing	~
	→ 关闭程序						R	×	
9	音看问题详细信息						10		

\*Benefits of LaTeX http://www.andy-roberts.net/writing/latex/benefits

Pros	Cons		
portable	compile, debug, view, edit		
write logically	not WYSIWYG		
mathematical equation			
easy control	unintelligent		
extremely powerful	steep learning curve		

#### TeXworks



#### Compilation

🚡 未命名-1.tex - TeXworks						
文件	编辑	搜索	格式	排版	脚本窗口帮助	
docur	pdfLaT pdfTeX pdfLaT					
0	XeTeX XeLaTe	х	eIndex+		■ I the price of eggs}	
\autho \$	ConTeX ConTeX	+ (T	ΓeX) ΓeX)	ibTeX		
\begin \mak	DIDIEA				<b>T</b>	
\section*{Introduction}						
Hello world!\\ %line break						
\subsection{Literature Review}						
Hello world!						
\end{document}						

#### Preamble:

\documentclass[options]{class} (e.g. \documentclass[10pt,a4paper]{article})

#### **Common Document Classes:**

article: scientific journals, presentations, short reports, invitations...

**IEEEtran: IEEE Transactions format** 

proc: articles with proceedings based on article class

book: real book

slides: for slides .....

\usepackage[options]{class} (e.g. \usepackage{amsmath})

#### **Common Packages:**

amsmath: additional mathematical typesetting amssymb: mathematical sysmbols graphics: provide graphics support hyperref: navigation support for PDF documents (clickable reference etc.)

•••••

- \begin{document}
- \end{document}

```
\documentclass{article} %This document is an article.
\title{Cartesian closed categories and the price of
eggs} % Its title is Cartesian closed categories and the price of eggs.
\author{Jane Doe} %Its author is Jane Doe.
\date{September 1994} %It was written in September 1994.
\begin{document}
    \maketitle
    Hello world! %The document consists of a title followed by the text
        Hello world!
\end{document}
```

#### Cartesian closed categories and the price of eggs

Jane Doe

September 1994

## 1.1 LaTeX-sections

Structure your document using sections in LaTeX:

When writing a paper, it's necessary to structure the content into logic units.

To achieve this, LaTeX offers us commands to generate section headings and number them automatically.

The commands to create section headings are straightforward:

Sectioning elements (sections, subsections, etc.)

 $\operatorname{section} \{ \}$ 

\subsection{}

\subsubsection{}

## 1.1 LaTeX-sections

#### \section & \subsection

```
\documentclass{article}
\title{Cartesian closed categories and the price of
eggs}
\author{Jane Doe}
\date{September 1994}
\begin{document}
   \maketitle
   \section{Introduction}
   Hello world!\\ %line break
   \subsection{Literature Review}
   Hello world!
   \end{document}
   Cartesian closed categories and the price of eggs
   Jane Doe
```

September 1994

#### 1 Introduction

Hello world!

1.1 Literature Review Hello world!

## 1.1 LaTeX-packages

- *Packages* add new functions to LaTeX
- All *packages* must be included in the *preamble*
- Packages add features such as support for pictures, links and bibliography

\documentclass{article}

\begin{document}

\begin{equation}

 $f(x) = x^2$ 

\end{equation}

\end{document}

Output: f(x)=x2 (1)

## 1.1 LaTeX-Equations

#### 1. Basic elements

Symbol	Command		
$\sin x$	\sin x		
$\cos x$	\cos x		
$\tan x$	\tan x		
$\cot x$	\cot x		
$\sec x$	\sec x		
000 m	\csc x		
$\csc x$	CSC X		
Symbol	Command		
	-		
Symbol	Command		
Symbol $\log x$	Command \log{x}		
Symbol $\log x$ $\log_a b$	Command \log{x} \log_a{b}		

		$a_0^2$		
Symbol	Command			
$\int f(x)dx$	\int f(x) dx			
$\int_a^b f(x)x$		\int_a^b f(x) x		
$\int_D f(x) dx$		\int_D f(x) dx		
$\iint f(x,y) dx dy$		\iint f(x,y) dx dy \iiint f(x,y,z) dx dy dz		
$\iiint f(x,y,z)dxd$	dydz			
$\oint_C F ds$		\oint_C F ds		
Symbol	Command			
1  0	\begin{matrix}1&0\\			
1 0	1&0\end{matrix}			
[1 0]	\begin	{bmatrix}1&0\\		
$\begin{bmatrix} 1 & 0 \end{bmatrix}$	1&0\er	nd{bmatrix}		

 $\sim 2$ 

LaTeX Math Symbols - A glossary https://www.latex-tutorial.com/symbols/math-symbols/

## 1.1 LaTeX-Equations

2. Inline math

surround it with dollar signs '\$'

```
Input:...
This formula $f(x)=x^2$ is an example
```

```
Output: This formula f(x) = x^2 is an example.
```

#### 3. equation environment

```
\documentclass{article}
\usepackage{amsmath}
\begin{document}
\begin{equation*} 1+2=3
Input: 1 + 2 = 3 Output: 1=3-2
\end{equation*}
\begin{equation*}
1 = 3 - 2
\end{equation*}
\end{document}
```

# 1.1 LaTeX-Equations

- LaTeX is a powerful tool to typeset math
- Embed formulas in your text by surrounding them with dollar signs \$
- The equation environment is used to typeset one formula
- The align environment will align formulas at the ampersand & symbol
- Single formulas must be separated with two backslashes  $\setminus$
- Use the matrix environment to typeset matrices
- Scale parentheses with \left( \right) automatically
- All mathematical expressions have a unique command with unique syntax
- Notable examples are:
  - \int^a\_b for integral symbol
  - $\frac{u}{v}$  for fractions
  - $\operatorname{sqrt}{x}$  for square roots
- Characters for the greek alphabet and other mathematical symbols such as \lambda

## 1.1 LaTeX-Figures

#### • Figure environment:

```
\begin{figure}[placement specifier]
... figure contents ...
\end{figure}
```

Specifier

- h place the float here
- t position at the top of the page
- b position at the bottom of the page
- p put on a special page for floats only
- ! override internal parameters for determining 'good' float position
- H place the float at precisely the location in Latex code. Require the float package. (i.e. \usepackage{float})

## 1.1 LaTeX-Figures

#### Input:

```
\documentclass{article}
\usepackage{graphicx}
\begin{document}
\begin{figure}
\includegraphics[width=5cm]{image.jpg}
        \caption{A Pic in NUAA.}%add caption
\end{figure}
\end{document}
```

Output:



Figure 1: A Pic in NUAA.

#### \includegraphics[...]{}

- width=xx
- height=xx
- keepaspectratio
- scale=xx
- angle=xx
- trim=l b r t (crop the imported image by l from the left,b from the bottom, r from the right, and t from the top, meanwhile set clip=true)
- page=x (for pdf with multiple pages)
- resolution=x (dpi)
# 1.1 LaTeX-Figures

#### Multiple images/subfigures

```
\usepackage{graphicx}
       \begin{document}
      \begin{figure}[h!]
         \centering
         \begin{subfigure}[b]{0.2\linewidth}
           \includegraphics[width=\linewidth] {image.jpg}
            \caption{First}
         \end{subfigure}
        \begin{subfigure}[b]{0.2\linewidth}
Input:
           \includegraphics[width=\linewidth]{image.jpg}
           \caption{Second}
         \end{subfigure}
         \begin{subfigure}[b]{0.2\linewidth}
           \includegraphics[width=\linewidth]{image.jpg}
           \caption{Third}
        \end{subfigure}
        \begin{subfigure}[b]{0.5\linewidth}
           \includegraphics[width=\linewidth]{image.jpg}
           \caption{Fourth}
         \end{subfigure}
         \caption{A Pic in NUAA, Multiple times.}
       \end{figure}
       \end{document}
```

#### Output:



(b) Second

(a) First

(c) Third



<sup>(</sup>d) Fourth

Figure 1: A Pic in NUAA, Multiple times.

# 1.1 LaTeX-Figures

- Use the graphicx package and figure environment to embed pictures
- Pictures will be numbered automatically
- Change the width of your image by using \includegraphics[width=\linewidth]{}
- Refer to pictures in your document by setting a \label and using the \ref tag
- Set the position of your image by adding a float option such as
   [h!]
- If you want to show multiple figures next to each other, use the subcaption package and the subfigure environment

### 1.1 LaTeX-Tables

• &(column seperator), \\ (row seperator)

```
\documentclass{article}
       \begin{document}
       \begin{table} [h!]
         \begin{center}
Input:
           \caption{Your first table.}
           \label{tab:table1}
           \begin{tabular}{|c|r} % <-- Alignments: 1st
      column left, 2nd middle and 3rd right, with vertical lines in between
             \textbf{Value 1} & \textbf{Value 2} &
      \textbf{Value 3}\\
             $\alpha$ & $\beta$ & $\gamma$ \\
             \hline
             1 & 1110.1 & a\\
             2 & 10.1 & b\\
             3 & 23.113231 & c\\
           \left( \frac{tabular}{tabular} \right)
         \end{center}
       \end{table}
       \end{document}
```

Output:

Table 1: Your first table.					
Value 1	Value 2	Value 3			
$\alpha$	eta	$\gamma$			
1	1110.1	a			
2	10.1	b			
3	23.113231	с			

### 1.1 LaTeX-Tables

#### Excel2LATEX

XI 🔒 🕤 🔹	¢, ÷	DATA.xls [兼容模式] - Excel	° a	
文件 开始	插入页面和	后局公式数据审阅视图加载项 ACROBAT	• <u> </u>	许逸凡,
🔲 Convert Table	to LaTeX	Excel2LaTeX	×	54
🔚 Convert All Sto	ored Tables to La	e     This is the selected range converted to LaTeX. Click the button to use the current selection.     'Sheet3'!\$A\$1:\$H\$27   Stored tables		
菜	単命令	EGLL & BEKOL & 2010/5/1 23:47 & BUBDA & 2010/5/2 0:13 & B744	Store	~
-	: × 🗸	ZGZJ & BOKAT & 2010/5/1 23:49 & BIGRO & 2010/5/2 0:00 & B738 LFPG & BEKOL & 2010/5/1 23:51 & NODOG & 2010/5/2 0:23 & B77W	Load	
	_	VHHH & BIPOP & 2010/5/1 23:52 & SIERA & 2010/5/2 0:16 & MD11 ZGSZ & MUBEL & 2010/5/1 23:54 & GYA & 2010/5/2 0:06 & B738	Loau	
▲ 1 落站 j	B 进扇区点 进扇	EGLL & BEKOL & 2010/5/1 23:54 & NODOG & 2010/5/2 0:25 & A346 VHHH & BEMAG & 2010/5/1 23:57 & SIERA & 2010/5/2 0:31 & B722	0 <u>v</u> erwrite	M N O P ^
	전제조 <u>문</u> 전제 PLT 201	ZJHK & BOKAT & 2010/5/1 23:58 & BIGRO & 2010/5/2 0:09 & B738	Delete	GRO
	BEKOL 201		Export All	ELKAL
	/IN 201		Export All	
	3EKOL 201 30KAT 201	U EGLL & BEKOL & 2010/5/2 0:07 & BUBDA & 2010/5/2 0:33 & B744		3A DAPRO LKO ZF OBLIK
	SOKAI 201 SEKOL 201			ELKAL
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		10/5/2 0:21 NODOG 2010/5/2 0:50 B744 NULL BEKOL IDUMA SHL YIN NODOG QP MAMS	SI RO AKNAV	ELKAL
		10/5/2 0:24 TAMOT 2010/5/2 0:55 B763 2010/5/2 1:57 PLT MABAG NOMAR NLG TAMOT		
		10/5/2 0:25 GURIN 2010/5/2 0:36 B737 2010/5/2 0:56 BIGRO GURIN		
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- P	Sheeti	Sheet3		•

## 1.1 LaTeX-Tables

- LaTeX offers the table and tabular environment for table creation
- The table environment acts like a wrapper for the tabular similar to the figure environment
- Alignment and vertical separators are passed as an argument to the tabular environment (e.g. \begin{tabular}{1|c||r})
- It's possible to align the content left (1), centered (c) and right (r), where the number of alignment operators has to match the desired number of columns
- The columns can be seperated by adding | in between the alignment operators
- Rows can be seperated using the \hline command and columns using the ampersand & symbol
- The newline \\ operator indicates the end of a row
- It's possible to refer to tables using \ref and \label
- Combine multiple rows and columns with the multirow package
- Display your tables in landscape using the rotating package

# 1.1 LaTeX-hyerlinks

- Add the hyperref package to your preamble
- Links will show up in a colored box which will be invisible when you print it.
- Use \href{URL}{DESCRIPTION} to add a link with description
- Use \url{URL} to add a link without a description

```
\documentclass{article} % or any other documentclass
\usepackage{hyperref}
\begin{document}
This is my link: \href{http://www.latex-tutorial.com}{LaTeX-Tutorial}.
\end{document}
```

This is my link: LaTeX-Tutorial.

# 1.1 LaTeX-hyerlinks

- Add the hyperref package to your preamble
- Links will show up in a colored box which will be invisible when you print it.
- Use \href{URL}{DESCRIPTION} to add a link with description
- Use \url{URL} to add a link without a description

```
\documentclass{article} % or any other documentclass
```

```
\usepackage{hyperref}
```

\begin{document}

You can also link to bare URLs without an additional description:

```
\url{http://www.latex-tutorial.com}
```

 $\ensuremath{\mathsf{end}}\$ 

You can also link to bare URLs without an additional description: http://www.latex-tutorial.com

### 1.1 LaTeX-more

LaTeX will use the section headings to create the *table of contents* and there are commands to create a *list of figures* and a *list of tables* as well.
 \documentclass{article}
 \begin{document}

\tableofcontents

\newpage

\section{Section}

Dummy text

\subsection{Subsection}

Dummy text

\end{document}

#### Contents

1	1 Section	<b>2</b>
	1.1 Subsection	 2

### 1.1 LaTeX-more

 The generation of a list of figures and tables works the same way \begin{document}

```
\begin{figure}
\caption{Dummy figure}
\end{figure}
```

•••

```
\begin{table}
\caption{Dummy table}
\end{table}
```

```
...
\begin{appendix}
 \listoffigures
 \listoftables
\end{appendix}
```

#### $\end{document}$

#### List of Figures

1	Dummy figure	2
$\mathbf{List}$	of Tables	
1	Dummy table	2

#### Finding .bib file



#### • Finding .bib file

@article{SS2018,			
title = "Complementary strengths of airlines under network disruptions",			
journal = "Safety Science",\			
volume = "103",			
number = "Supplement C",			
pages = "76 - 87",			
year = "2018",			
issn = "0925-7535",			
doi = "https://doi.org/10.1016/j.ssci.2017.11.010",			
url =			
"http://www.sciencedirect.com/science/article/pii/S0925753517308676",			
author = "Xiaoqian Sun and Sebastian Wandelt",			
keywords= "Airline disruption, Network robustness, Air transportation"}			

#### Compile with BibTex



Way: run bibtex manually

- D pdflatex example.tex
- 2 bibtex example
- 3 pdflatex example.tex
- 4 pdflatex example.tex

#### **Explanation:**

- 1. tell bibtex what literature we cited in our paper
- 2. translate .bib file into proper output
- 3. merge the reference section with our LaTeX document
- 4. assign successive numbers in the last step

#### BibTeX Styles:

#### Abbrv, Alpha, Apalike, IEEEtr, Plain

#### References Abbrv

- [1] J. Doe. Title. Journal, 2017.
- [2] J. Doe. The Book without Title. Dummy Publisher, 2100.
- [3] J. Doe. The Book without Title, pages 100–200. Dummy Publisher, 2100.
- [4] Intel. 8259a programmable interrupt controller. http://bochs. sourceforge.net/techspec/intel-8259a-pic.pdf.gz, Dec 1988. Accessed on 2012-11-11.

#### **References** Alpha

[Doe, 2017] Doe, J. (2017). Title. Journal.

[Doe, 2100a] Doe, J. (2100a). The Book without Title. Dummy Publisher.

[Doe, 2100b] Doe, J. (2100b). The Book without Title, pages 100–200. Dummy Publisher.

[Intel, 1988] Intel (1988). 8259a - programmable interrupt controller. http: //bochs.sourceforge.net/techspec/intel-8259a-pic.pdf.gz. Accessed on 2012-11-11.

#### BibTeX Styles:

#### Abbrv, Alpha, Apalike, IEEEtr, Plain

#### References IEEEtr

- [1] J. Doe, *The Book without Title*. Dummy Publisher, 2100.
- [2] Intel, "8259a programmable interrupt controller." http://bochs. sourceforge.net/techspec/intel-8259a-pic.pdf.gz, Dec 1988. Accessed on 2012-11-11.
- [3] J. Doe, "Title," Journal, 2017.
- [4] J. Doe, The Book without Title, pp. 100–200. Dummv Publisher. 2100.

#### **References Plain**

- [1] John Doe. Title. Journal, 2017.
- [2] John Doe. The Book without Title. Dummy Publisher, 2100.
- [3] John Doe. The Book without Title, pages 100–200. Dummy Publisher, 2100.
- [4] Intel. 8259a programmable interrupt controller. http://bochs. sourceforge.net/techspec/intel-8259a-pic.pdf.gz, Dec 1988. Accessed on 2012-11-11.

- Generate a bibliography with BibTeX
- First define a .bib file using: \bibliography{BIB\_FILE\_NAME}
- > For BibTeX put the \bibliography statement in your document
- BibTeX uses the \bibliographystyle command to set the citation style
- BibTeX uses the \cite command

## 1.1 LaTeX-Resources

Tools:

- MikTeX (<u>http://miktex.org/</u>) latex distribution + package manager
- TeXShop (<u>http://www.uoregon.edu/ koch/texshop/</u>) IDE for latex on Mac (from Krzysztof et. al)
- Kile (<u>http://kile.sourceforge.net/</u>) IDE for linux

Guide Books

- LaTeX—(<u>https://en.wikibooks.org/wiki/LaTeX</u>) a guide to the LaTeX markup language
- LaTeX-Tutorial.com\_(<u>https://www.latex-tutorial.com/</u>) tutorial for quick start
- LATEX Project—(<u>http://www.latex-project.org/</u>) links to documentation, information about latex

### Übung macht den Meister

#### **Practice makes perfect**

## Outline

- 1.1 What is scientific writing?
- 1.2 **Why** it is important?
- 1.3 **How** to improve it?
- 1.4 **Where** to publish it?

# **Final Project**

#### A summary of minimum 2 pages for one of the three papers: (A4 format, 12 pounds, single line space)

- 1. What is the problem to be addressed?
- 2. What motivates interest? Why is it hard? Why is it important?
- 3. What's the new idea here?
- 4. What are the good points of the paper according to our lecture?
- 5. What can be further improved according to our lecture?

Final summary should be sent to <u>kxxz2021@126.com</u> **before 7<sup>th</sup> November (23:59, Sunday)** with the following name format <u>Name\_StudentID</u>

# Paper list

1. Xiaoqian Sun et al., Vaccination Passports: Challenges for a Future of Air Transportation. Transport Policy 110, pp. 394-401, 2021 <a href="http://dx.doi.org/10.1016/j.tranpol.2021.06.018">http://dx.doi.org/10.1016/j.tranpol.2021.06.018</a>

2. Sebastian Wandelt et al., Estimation and improvement of transportation network robustness by exploiting communities. Reliability Engineering & System Safety 206, pp. 107307, 2021 <u>http://dx.doi.org/10.1016/j.ress.2020.107307</u>

3. Yida Ding et al., TLQP: Early-stage Transportation Lock-down and Quarantine Problem. Transportation Research Part C-Emerging Technologies 129, pp. 103218, 2021

http://dx.doi.org/10.1016/j.trc.2021.103218

### Thank you very much!