How to Write an Effective Technical Paper

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IEEE PES CCC Webinar
29 August 2020

Webinar Speaker,

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Education

Ph.D., Electrical Engineering, Virginia Polytechnic Institute and State University, 1978.
M.S., Electrical Sciences, State University of New York at Stony Brook, 1975.
B.Sc., Electrical Engineering, Bangladesh University of Engineering and Technology, Dhaka, 1972

Professional Society Activities

- IEEE Member since 1975, Fellow 1998, Life Fellow 2014
- President, IEEE PES, 2018-2019
- Vice president, Publications, IEEE PES, 2001-2003, 2012-2013
- Vice President, Publications, IEEE, 2006
- Editor-in-Chief, IEEE Transactions on Sustainable Energy, 2010-2012
- Editor-in-Chief, IEEE Electrifications Magazine, 2013-2014
- Launched, the IEEE Power & Energy Technology Systems Journal (Open Access), 2014

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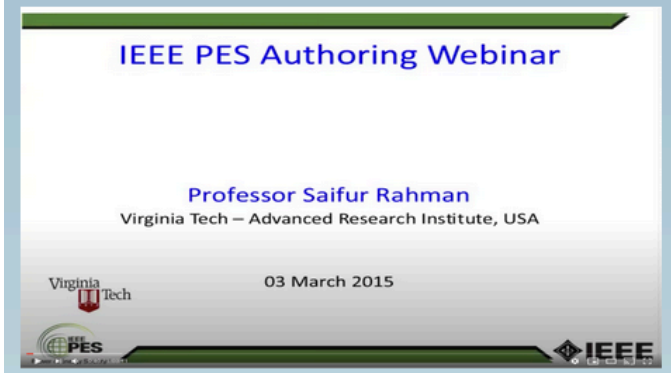
IEEE Related Media



IEEE PES Power & Energy Society®

IEEE

Audience

Scientific research publishing

- Who writes scientific papers?
  - Engineers, scientists, educators and researchers from:
    - Corporations
    - Academia
    - Government
  - Students typically write and present conference papers before submitting journal articles

Audience

What IEEE editors and reviewers are looking for

- Content that is appropriate, in scope and level
- Clearly written original material that addresses a new and important problem
- Extension of previously published work
- Valid methods and rationale
- Illustrations, tables and graphs that support the text
- References that are current and relevant to the subject

Audience

How does the review process work?

- Editor-in-Chief gets the paper after it goes through content match check (iAuthenticate) and “banned author” check
- If the paper is in scope for the journal, it is assigned to an editor (associate editor)
- Editor assigns the paper to five or more reviewers
- Reviewers send their comments back to the editor
- Editor makes a recommendation to the EIC as follows:
  - Accept
  - Revise & Resubmit
  - Reject
- The EIC makes the final decision and informs the corresponding author

Audience

Why IEEE editors and reviewers reject papers

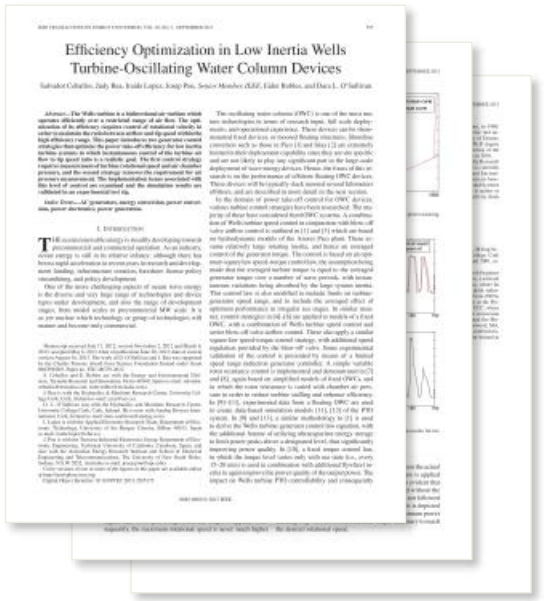
- The content is not a good fit for the publication
- There are serious scientific flaws:
  - Inconclusive results or incorrect interpretation
  - Fraudulent research
- It is poorly written
- It does not address a big enough problem or advance the scientific field
- Most of the work was previously published
- The quality is not good enough for the journal
- Reviewers have misunderstood the article

Structure

Paper Structure

Elements of a manuscript

- Title
- Abstract
- Keywords
- Introduction
- Methodology
- Results/Discussions/Findings
- Conclusion
- References

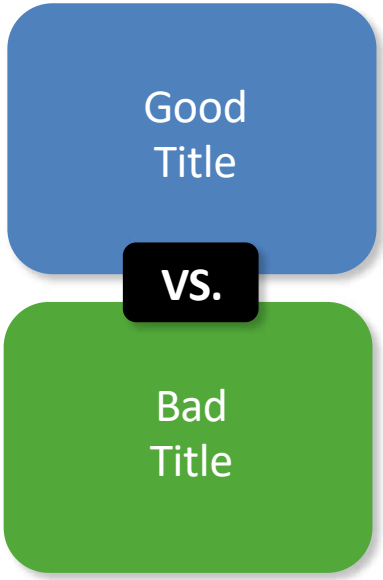


Paper Structure

Title

An effective title should…

- Answer the reader's question: *"Is this article relevant to me?"*
- Grab the reader's attention
- Describe the content of a paper using the fewest possible words
  - Is crisp, concise
  - Uses keywords
  - Avoids jargon

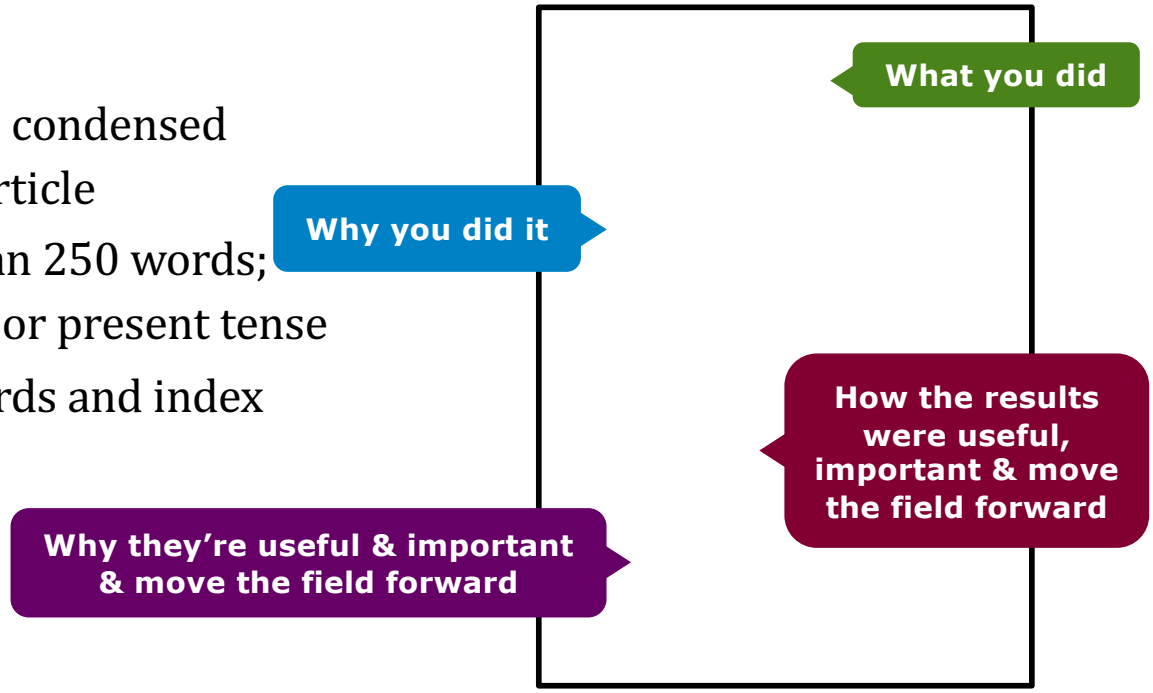


Paper Structure

Abstract

A "stand alone" condensed version of the article

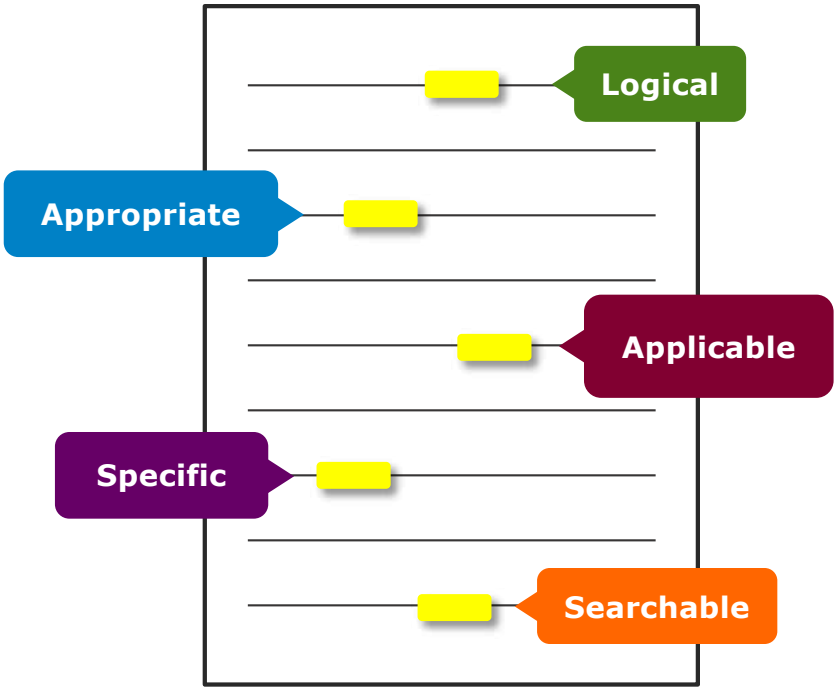
- No more than 250 words; can use past or present tense
- Uses keywords and index terms



Paper Structure

Keywords

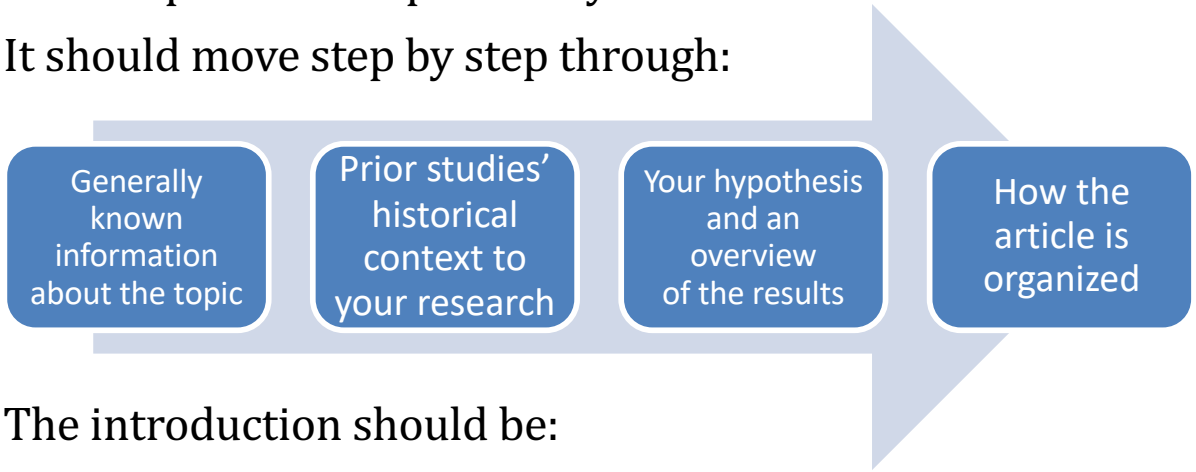
Use in the Title and Abstract for enhanced Search Engine Optimization



Paper Structure

Introduction

- A description of the problem you researched
- It should move step by step through:



- The introduction should be:
  - Specific, not too broad or vague
  - About 1-2 pages
  - Written in the present tense

Paper Structure

Methodology

- Problem formulation and the processes used to solve the problem, prove or disprove the hypothesis
- Use illustrations to clarify ideas and support conclusions:

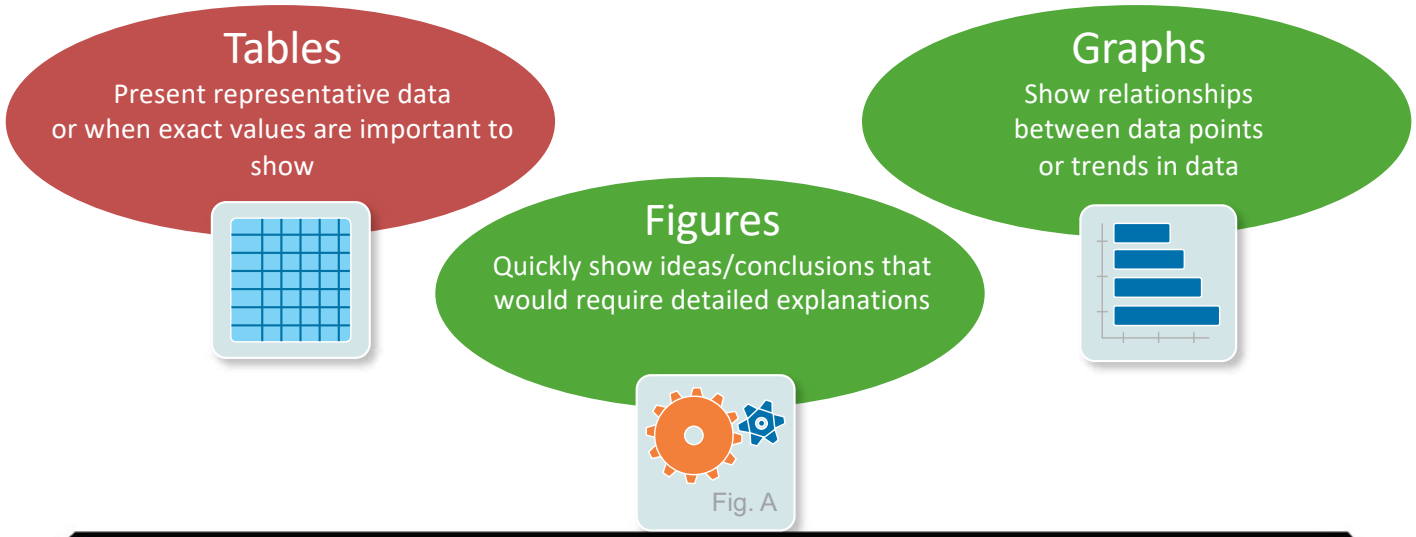
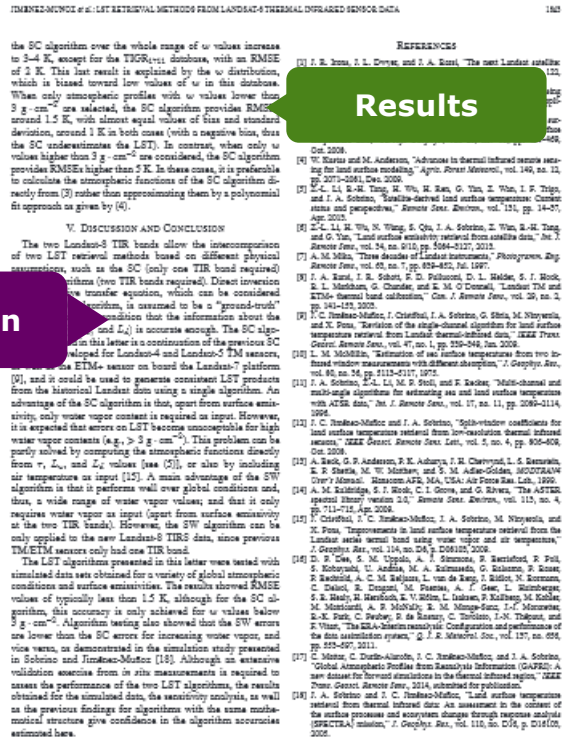


Fig. A

Paper Structure

Results/discussion

Demonstrate that you solved the problem or made significant advances



Results

Discussion

Results: Summarizes the Data

- Should be clear and concise
- Use figures or tables with narrative to illustrate findings

Discussion: Interprets the Results

- Why your research offers a new solution
- How can it benefit other researchers professionals

Paper Structure

Conclusion

- Explain what the research has achieved
  - As it relates to the problem stated in the Introduction
  - Revisit the key points in each section
  - Include a summary of the main findings and implications for the field
- Provide benefits and shortcomings of:
  - The solution presented
  - Your research and methodology
- Suggest future areas for research

Paper Structure

References

- Support and validate the hypothesis your research proves, disproves or resolves
- There is no limit to the number of references
  - But use only those that directly support your work (about 30)
- Ensure proper author attribution
  - Author name, *article title*, publication name, publisher, year published, volume and page number, Digital Object Identifier (DOI)

Properly cited material

1576 IEEE TRANSACTIONS ON SMART GRID, VOL. 5, NO. 4, JULY 2014

We then have

$$(P_t^{h+}+P_t^{d-})^2-(P_t^{d+}-P_t^{h-})^2+4P_t^{h+}P_t^{d-} < (\hat{P}_t^{d+}-\hat{P}_t^{h-})^2+4\hat{P}_t^{h+}\hat{P}_t^{d-} -(\hat{P}_t^{d+}+\hat{P}_t^{h-})^2. \quad (32)$$

Since $P_t^{h+}-P_t^{h-}=\hat{P}_t^{d+}-\hat{P}_t^{d-}$, we then have $P_t^{h+}<\hat{P}_t^{h+}$, and $P_t^{d-}<\hat{P}_t^{d-}$. Because the operational cost is an increasing function of $\{P_t^{d+},P_t^{h-}\}$, we obtain that

$$c_{u/ut}(P_t^{d+},P_t^{d-})<c_{u/ut}(\hat{P}_t^{d+},\hat{P}_t^{d-}). \quad (33)$$

Therefore the optimal pair $\{P_t^{h+},P_t^{d-}\}$ must satisfy that $P_t^{d+}P_t^{h-}=0$, i.e., only one of P_t^{d+},P_t^{h-} can be non-zero. ■

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Dr. Nehorai served as Editor-in-Chief of IEEE TRANSACTIONS ON SIGNAL PROCESSING from 2000 to 2002. From 2003 to 2005 he was the Vice President of the IEEE Signal Processing Society (SPS), the Chair of the Publications Board, and a member of the Executive Committee of this Society. He was the founding Editor of the special columns on Leadership Reflections in *IEEE Signal Processing Magazine* from 2003 to 2006. He has been a Fellow of the IEEE since 1994, the Royal Statistical Society since 1996, and the AAAS since 2012.

Ethics

Ethics

Ethical publishing

Plagiarism

- Avoid plagiarism
  - Cite and separate any verbatim copied material – but how much?
  - Paraphrase other's text properly, and include citation
  - Credit any ideas from other sources
  - Familiarize yourself with IEEE Policies

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IEEE Open Access Journal of Power and Energy

- Will start publishing articles from January 2020
- Existing OA Journal of Power and Energy Technology Systems will be rebranded with this new name, scope covering the entire field of PES for both practice-oriented and academic articles
- Article processing charge subsidised at US$1350
- Between 10-15 articles each year will receive further subsidy depending on authors' affordability/circumstances

PES Full Open Access Option #2

A dedicated section on Power & Energy for publishing papers in the PES field in IEEE Access

- The section will start from January 2020, submissions started in September 2019
- Paper will be handled by 3 PES-appointed Editors
- APC: US$1750

Impact Factor

Impact Factor from Journal Citation Reports

Impact Factor is not necessarily enough of a metric

Other attributes:

- Journal's reputation in the community is important
- For new and lesser known journals – look at the editorial board, their reputation

Process of Writing the Paper

Discuss the content among team members
Literature search – Reference List
Description of the Experiment/Model
Results/Discussion
Write the Conclusion
Collect the components – Prepare the draft
All members comment on the draft
Produce the final copy

Prof. Saifur Rahman (s.rahman@ieee.org)

https://www.srahman.org

Past-President of IEEE Power & Energy Society
Past-Chair, IEEE Publication Services & Products Board

PES accomplishments:

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- PES Corporate Engagement Program
- PES Chapters' Councils in China, India, Africa and Latin America