

Session 2: Title, Abstract and Introduction

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BEFORE PUTTING PEN ON PAPER...



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Before starting, ask these questions:

Is my work publishable?

1. Have I done **something new** and interesting?
2. Is there **anything challenging** in my work?
3. Is my work related to a current **hot topic**?
4. Have I **provided solutions** to some difficult problems?

If yes, then you can start writing.
If not, do some rethinking



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Decide on Type of Manuscript

- Original Research Paper
- Review Paper
- Letter/Short Communication



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Structure of Scientific Paper: IMRAD

- IMRAD (Introduction, Methods, Results, and Discussion)
- Introduction: **What did you/others do? Why did you do it?**
- Methods: **How did you do it?**
- Results: **What did you find?**
- And
- Discussion: **What does it all mean?**

Of course, an article begins with the Title, Abstract and Keywords



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Storyline


- The paper must have a **clear storyline**.
 - It should have one or two central issues that you want to address.
 - Do not “cloud” the paper with too many issues until readers become confused.
 - The selected issues become the theme/direction of the paper
 - Build the storyline around the issue.
- The hypothesis, objective must be well articulated.




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THE TITLE




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Title of the Article

- Looks trivial, **but not so**.
- Extremely important
 - It can determine the number of readers that read/download your paper.
 - It attracts the audience from the correct field
 - A good title also helps in getting priority in search engines.
- It is a “summary” and “essence” of your paper in **no more than 12 words**
- Should be “**encompassing**” as well as “**descriptive**”.



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What Makes a Good Title

- **Condenses** the paper's content in a few words
- **Captures** the readers' **attention**
- **Differentiates** the paper from other papers of the same subject area
- Show your **strength** (specialty)



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Formulating a Title: Basic Tips

- Use simple and concise statements
- Utilize **Thesaurus** to get more options for words (be careful to fully understand how the alternative word is used in what context!)
- **List down** key (important) words
 - That is central to the paper
 - Used numerous times
 - That would be picked-up by search engines.




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Title: What to avoid


- Redundancies.
 - Example:
 - “On the design of...”
 - Can be simplified to: “Design of...”
 - Example:
 - “...building and constructing of a simplified...”
 - Can be rephrased as: “...development of a simplified...:”
- Acronyms (depends on journal).
- Avoid words such as “**novel**”, “**new**”, “**original**” unless they really are.
- Be modest: Use “**improved**”, instead



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Title: Good Examples

- An **Improved** Particle Swarm Optimization (PSO)-Based MPPT for PV **with Reduced Steady-State Oscillation** (*show your strength, specialty*)
- **Simple, fast and accurate** two-diode model for photovoltaic modules”. (*show your strength*)
- Solar charging of electric vehicle using solar photovoltaic: A **critical** review (*show your specialty*)
- Analysis, Design and Implementation of Multiple Parallel Ozone Chambers **for High Flow Rate** (*show your specialty*)



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Title: Poor Examples

- Design of Particle Swarm Optimization (PSO)-Based MPPT (nothing special)
- Two-diode model for photovoltaic modules (too general).
- Design and Implementation of Multiple Parallel Ozone Chambers



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Keywords

- Crucial when search is done for articles from databases
- Carefully choose words that represent the theme of the paper
- Not too general, e.g. physics, science, engineering, power
- Not too specific such that your paper cannot be discriminated during search



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ABSTRACT



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What is an Abstract?

- In approximately 150–250 words, you need to summarize your findings, and describe the results and implications of the findings.
- A powerful representation of your article.
 - Its a microcosm of the full article.
 - Correctly written, it can contain a complete description of your research.
- It gives the “first impression”
 - It decides whether the article pertains to the readers interests and needs.
 - The entry point to get into the review system



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Abstract Features

- Single paragraph
- Self-contained (independent)
- Without abbreviations, footnotes, or references.
- Should not contain mathematical equations, diagram or tabular material.
- Three or four different keywords or phrases, as this will help readers to find it.
- Reads well and is grammatically correct.



Important Elements of Abstract

1. State the **primary objective** of the paper.
2. Highlight the merits (or **contribution**).
3. Give a conceptual **idea** on the method
4. Describe the research design and **procedures/processes** employed (is it simulation, experimental, survey etc.)
5. Give the **main outcomes or results**, and the **conclusions** that might be drawn.
6. Include any **implications** for further research or application/practice, if any.



Abstract Example No. 1

“This paper proposes an improved maximum power point tracking (MPPT) method for Photovoltaic (PV) system using a modified particle swarm optimization (PSO) algorithm. The main advantage of the method is the simplicity and speed of the algorithm such that it can be computed rapidly using a low cost microcontroller. The speed of convergence is achieved by forcing the PSO into a non-random mode, thus avoiding the need to deal with the uncertainty of random numbers. To test the effectiveness of the proposed method, MATLAB simulations are carried out under very challenging conditions, namely step changes in irradiance, step changes in load and partial shading of PV array. In addition, an experimental rig that comprises of a buck-boost converter fed by a custom-designed solar array simulator is set-up to emulate the simulation. The superiority of the proposed method over the conventional Hill Climbing (HC) is confirmed by a 30% increase in the convergence speed and a 50% decrease in the steady state oscillations. It is envisaged that the method can be very useful in the design of a practical high performance, low cost inverter with MPPT.” (180 words)

ADOPTED FROM:

K. Ishaque, Z. Salam, M. Amjad, and S. Mekhilef, "An Improved Particle Swarm Optimization (PSO)-Based MPPT for PV With Reduced Steady-State Oscillation", *IEEE Transactions on Power Electronics*, vol. 27, pp. 3627-3638, 2012.



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Good Abstract? Let's check

1. State the **primary objective** or hypothesis of the paper **clearly**.

“This paper proposes an improved maximum power point tracking (MPPT) method for Photovoltaic (PV) system using a modified particle swarm optimization (PSO) algorithm.”

2. Highlight the **merits** (or contribution) of the paper in the **strongest possible words**.

The main advantage of the method is the simplicity and speed of the algorithm such that it can be computed rapidly using a low cost microcontroller.



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3. Give a conceptual idea (method) **on how the contribution is achieved.**

The speed of convergence is achieved by forcing the PSO into a non-random mode, thus avoiding the need to deal with the uncertainty of random numbers.

4. Describe briefly the research design and **procedure** employed

To test the effectiveness of the proposed method, MATLAB simulations are carried out under very challenging conditions, namely step changes in irradiance, step changes in load and partial shading of PV array. In addition, an experimental rig that comprises of a buck-boost converter fed by a custom-designed solar array simulator is set-up to emulate the simulation.



5. Give the **main outcomes or results**, and the **conclusions** that might be **drawn from these data and results.**

The **superiority of the proposed method** over the conventional Hill Climbing (HC) is confirmed by a **30% increase** in the convergence speed and a **50% decrease** in the steady state oscillations.

6. Include any implications for further research or application/practice, if any.

It is envisaged that the method can be very useful in the design of a practical high performance, low cost inverter with MPPT.



Example No. 2

This paper proposes an improved modelling approach for the two-diode model of photovoltaic (PV) module. The main contribution of this work is the simplification of the current equation, in which only four parameters are required—compared to six or more in the previously developed two-diode models. This is achieved by equating the values of the series and parallel resistances, and subsequently computing them using fast iterative method. To validate the accuracy of the proposed model, six PV modules of different types (multi-crystalline, mono-crystalline and thin-film) from various manufacturers are tested. The performance of the model is evaluated against the popular single diode models. It is found that the proposed model is superior when subjected to irradiance and temperature variations. In particular the model matches very accurately for all important points of the I-V, i.e. by less than 1%. The modelling method is useful for PV power converter designers and circuit simulator developers who require simple, fast yet accurate model for the PV module.

Objective

Merit

Idea

Procedures

Results

Implications

ADOPTED FROM:

Kashif Ishaque, **Zainal Salam**, Hamed Taheri, "Simple, fast and accurate two-diode model for photovoltaic modules", *Solar Energy Materials & Solar Cells*, 95 (2011) 586–594.



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Make sure to do proof reading!

A complaint from an editor:

"This paper fell well below my threshold. I refuse to spend time trying to understand what the author is trying to say.

Besides, I really want to send a message that they can't submit garbage to us and expect us to fix it.

My rule of thumb is that **if there are more than 6 grammatical errors in the abstract, then I don't waste my time reading the rest.** "



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Common Mistakes in Abstracts

- Writing “historical” information
- The use of generic words: high, low, small, big.
- Storyline in Abstract not sequential
- Not proof read



Example of Poor Abstract

Large and small scale PV power systems have been commercialized in many countries. One of the important approach for system design is to use simulators to predict the output of PV systems under varying environmental conditions. This paper proposes a MATLAB Simulink simulator for photovoltaic (PV) system using two-diode model. This model has better accuracy at low irradiance level, thus allowing for a more accurate prediction of PV system performance. To reduce computational time, values of R_p and R_s are estimated by an efficient iteration method. Furthermore, all the inputs to the simulator are information available on standard PV module datasheet. The results are found to be very accurate for five PV modules of different types (multi-crystalline, mono-crystalline, and thin-film) from various manufacturers.



What's wrong?

Large and small scale PV power systems have been commercialized in many countries. One of the important approach for system design is to use simulators to predict the output of PV systems under varying environmental conditions. This paper proposes a MATLAB Simulink simulator for photovoltaic (PV) system using two-diode model. This model has better accuracy at low irradiance level, thus allowing for a more accurate prediction of PV system performance. To reduce computational time, values of R_p and R_s are estimated by an efficient iteration method. Furthermore, all the inputs to the simulator are information available on standard PV module datasheet. The results are found to be very accurate for five PV modules of different types (multi-crystalline, mono-crystalline, and thin-film) from various manufacturers.



THE INTRODUCTION



The Introduction Section

- Aims:
 - To state the objective/hypothesis
 - To justify the significance of your work
 - To connect your work to previous research
- Use concept of logical funnel
 - More general aspects are told first
 - Followed by narrower details



Introduction: What should it contain?

- Start with an “general” overview
 - Simple to understand even for non-experts
 - To motivate readers
 - To position your article into previous research
- Followed by a compact, focused literature review
 - Case build-up
 - To Highlight the inadequacies.
 - To establish “gap”, “problem”, “shortcomings” in the literature
 - Allows you to suggest some new concept/remedial/improvement
- At the end
 - To state your idea, your proposed solutions, ideas, research question etc.

Introduction: Key Points

- Accurate literature
 - Only relevant reference pertaining to the issue is cited
- Convincing Arguments
 - The reviewer must be made to acknowledge **the importance of the issue**
 - There is a **research (knowledge) gap with is inadequately addressed**
- Propose your Solution
 - This will be the **contribution of the paper**
 - The objective must be very stated clearly.



Example of Introduction

ADOPTED FROM

Muhammad Amjad, **Zainal Salam**, "Analysis, Design and Implementation of Multiple Parallel Ozone Chambers for High Flow Rate", *IEEE Transactions Industrial Electronics*, Vol. 61, No. 2, Feb 2014, pp. 753-765.



Overview

“Ozone is a powerful oxidizing agent that has been increasingly used in industrial, pharmaceutical and agriculture applications [1]-[3]. Unlike other oxidizing chemicals such as chlorine, it leaves no harmful residue to the environment.”

General statements: motivational in nature, easy to understand.

General reference are cited

The most viable method to generate ozone by using the dielectric barrier discharge (DBD) that is powered by resonant converter [4].”

Becoming more specific; not easily to be understood.
Trying to link to the “focused” literature.



Focused Literature

“Among the resonant inverters, the full-bridge [5], push-pull [6], and class E resonant circuits [7] are widely employed. In majority of the cases [5]-[10], high frequency transformer is utilized to boost the voltage to a sufficiently high level to initiate ozone formation.”

This is the “focused” literature.

Giving the reader information of the related previous work.
The theme of the paper is slowly being established.



Looking for “the Knowledge Gap”

“**Despite** the simplicity of resonant inverter, its transformer exhibits several disadvantages: 1) decreased efficiency, 2) high voltage spikes and (3) introduction of electromagnetic interference [8].”

See how the inadequacy of the previous work is exposed?

Use “CONTRAST” cohesive words for “smooth” transition

Despite the fact...
On the contrary...
On the other hand...
However...
Conversely...
Having said that...
But then...
Alternatively...
Another possibility would be...
In comparison...
Even though...



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Proposing your idea!

Once the “gap” or “inadequacy” is established, propose your solution to the issue. This will be the main contribution of your paper

“**In view of these shortcomings**, an improved transformer-less resonant inverter is proposed in this paper.”

These “linking phrases” may help

Based on these findings...
In light of these conclusions...
From the above discussions, it is clear that...
Regardless of the points made by...



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Reinforcing your idea...

Giving a couple of merits of your proposed idea would make your argument more convincing.

“The **key benefits** of the proposed resonant inverter topology are simplicity and lower cost. **Another advantage** of the proposed technique”

Alternatively you can try the “reversed psychology” approach

“**Interestingly**, to date no researcher has exploited the characteristic the resonant topology”. This may be probably due to impression that...”



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Re-enforcing by explaining the significance of study

Significant of the study:

- To accomplish this aim and to respond to a recent call for research to ...
- The findings of this study will help ...
- The contribution of this study is obvious as the resulting outcomes can be capitalized as guidelines to ...
- The current study contributes to our knowledge by addressing four important issues. First, ...



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Now tell a bit of detail on how your idea will work

The idea is based on the of current sharing of two switches. Unlike other approaches thus far—which rely on voltage division, the resonant current is forced to flow into the power switches.”

Just reveal a bit, perhaps the main principles that may catch the interest of reader. Something like a summary of the idea



Paper outline

“The remaining of the paper is organized as follows. In section II, the ozone chamber parameter determination is explained. In section III, the complete ozone generation system is presented. Finally, the conclusions and future recommendation are given section IV.”

Not necessarily... but its nice to put in, if you have extra pages.



WRITING STYLES

Some useful sentences and phrases



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Writing the Overview (1)

- During the past twenty years, much more information has become available on ...
- A considerable amount of literature has been published on the issue. These studies ...
- The first serious discussions and analyses of the issue emerged during the early 1980s with ...
- Historically, research investigating the factors associated with this issue has focused on ...
- What we know about the issue is largely based upon empirical studies that investigate how ...



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Writing the Overview (2)

- For many years, this phenomenon was surprisingly neglected by ...
- There is a large volume of published studies describing the role of ...
- Over the past decade, most research in the issue has emphasized the use of ...
- In recent years, there has been an increasing amount of literature on ...



Writing Focused Literature (1)

Highlighting similar findings

- ❖ Similarly, Author in [1] found ...
- ❖ Authors in [1] added that the ...
- ❖ The idea is supported by study in [1], which reveal that ...
- ❖ Author in [1] also provided and found similar results to those obtained in [2].
- ❖ In addition to work of Author A, Author B conclusively agree to...



Writing Focused Literature (2)

Highlighting similar findings

- ❖ The findings is **in agreement with the** findings of past studies by Author A, which ...
- ❖ The above findings is **consistent with** the study by Author...
- ❖ This is consistent with the work of Author A, which concluded that ...
- ❖ Research finding by Author A **also points towards** the results work in [4].



Writing Focused Literature (3)

Highlighting Contradictions

- **However**, a number of studies show that significant differences do exist, albeit findings are somewhat contradictory.
- The authors in [1] found certain **differences, suggesting that** ...
- **In contrast**, the results by published in [2] indicated that ...



Writing Focused Literature (4)

Highlighting Contradictions

- The above findings **contradict** the study by Author A...
- Interestingly, **this is in contrary** to a study conducted by Author A.
- **Despite** prior evidence given in [2], ...
- These results **were contradicted** by the experiments in [1] which considered ...
- However, it was later shown by Author A that



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How to Highlight the Gap (1)

- ❖ From the overview, it can deduced that there is little published data on... Thus...
- ❖ Despite the numerous work that are carried out on the same subject, no previous study has investigated... Hence this work..
- ❖ As highlighted by [1], the application of X has not been thoroughly investigated... There is a need...
- ❖ Although there has been quantitative analysis of..., no detailed investigation of ...



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Highlighting the Gap (2)

- ✓ **In contrast** to popular assumptions, the data about the efficacy... It appears that...
- ✓ Up to now (**so far, until recently**), little attention has been paid to ...
- ✓ A search of the literature revealed that limited studies have focused on ...
- ✓ Since the impact of X on Y is not well understood...
- ✓ **On the contrary**, few studies have investigated X in any systematic way ...



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Highlighting the Gap (3)

- ✧ Despite these shortcomings, there have been no studies which compares ... Hence this work...
- ✧ Up to now, the problem has received scant attention...
- ✧ Only until recently the issue has been addressed, but the depth is insufficient...
- ✧ On contrary to popular belief, there are few studies that have investigated the association between ...
- ✧ So far , no large-scale studies have been performed to investigate the prevalence of ...



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Highlighting the Gap (4)

- ❖ But then, a thorough study has not been carried out...
- ❖ Although studies have recognized X, research has yet to systematically investigate the effect of ...
- ❖ Since the publication of X forty years ago, there has only been a limited amount of original research into the history of ...



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Highlighting Gap for Review Paper (1)

- ❖ So far, there has been very few work that review the....
- ❖ In addition, no paper has comprehensively review...
- ❖ Surprisingly, the review of the subject has not been thoroughly carried out...
- ❖ Surprisingly, the review has not been comprehensively undertaken and it is unclear to what extent ...
- ❖ In contrast to the previous review paper, there is much less information about effects of ...



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Highlighting Gap for for Review Paper (2)

- ✧ A systematic review of the subject is crucial in understanding the...
- ✧ Despite the importance of the subject, there appears to be a lack of a comprehensive review of...
- ✧ Although there exists several excellent review papers on the subject, the focus is not on...
- ✧ Due to the importance of the work, and the lack of a critical review on it, it is high time for a comprehensive...



Bottom line:

You need to write the introduction in such a way that the **reviewer is convinced** and could not refuse to read the paper further





Thank you...

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