Dr. Ravi Anand

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Scopus

Research Interests

- Power electronic applications
- Multilevel inverters
- Switched-capacitor based inverter
- PWM control techniques
- DC-DC converters
- DC-AC converters
- Hardware design of power electronics converter

Education

2021 – 2024 **Ph.D., NIT PATNA** (New High Gain Multilevel Inverters with Reduced Component Count)
CGPA: *9.0/10*

2019 – 2021 **M.Tech., NIT PATNA** (Power System)
CGPA: *8.98/10*

2013 – 2017 **B.Tech., NIET, Greater Noida** (Electrical and Electronics Engineering)
Percentage: *79.34%*

2011 – 2013 ***12th*, B.S. Collage Simraha, Saharsa** (PCM)
Percentage: *75.00%*

2011 ***10th*, R.S.M.P.S. Supaul** (ALL)
CGPA: *8.4/10*

Achivements

- **Senior Research fellowship (SRF)** at NIT Patna from the Ministry of Education, Govt. of India.
- **Two-year Junior Research fellowship (JRF)** at NIT Patna from the Ministry of Education, Govt. of India.
- **Scholarship grant** from Ministry of Education, Govt. of India to pursue M. Tech.
- **Graduate Aptitude Test in Engineering (GATE)** 2019 qualified.

Experiences

03/08/2024–Contd. **Assistant Professor at Noida International University, Greater Noida**

Skills

Languages	Strong reading, writing, and speaking competencies for English, Hindi.
Software	MATLAB, PSIM, PLECS Software, LaTeX, …
Micro-controller	Arduino atmega 2560, TMS320F28379D, …
Misc.	Academic research, teaching, training, consultation, LaTeX typesetting and publishing.

Research Publications

Patent

1. Mandal, R. K., Singh, A. K., **Ravi Anand**, Chaudhary, A., & Ghosh, A. (Indian Patent). *A quadruple boost soft-charging switched-capacitor dc to ac converter*. **Indian Patent** (Under hearing).
2. **Ravi Anand**, & Mandal, R. K. (Indian Patent). *A 13-level switched-capacitor based multilevel inverter*. **Indian Patent** (2025, Patent Grant No.-IN564862).

List of Published Journal Articles

1. Singh, A. K., Mandal, R. K., & **Ravi Anand**. (a2023). A novel 5l boosting inverter with reduced spike current. ***IEEE Transactions on Circuits and Systems II: Express Briefs***, 1–1. doi:10.1109/TCSII.2024.3379211
2. Singh, A. K., Mandal, R. K., & **Ravi Anand**. (a2022). Quasi-resonant switched-capacitor based 7-level inverter with reduced capacitor spike current. ***IEEE Journal of Emerging and Selected Topics in Power Electronics***, 1–1. doi:10.1109/JESTPE.2022.3224536
3. **Ravi Anand**, & Mandal, R. K. (2024a). A five-level (5-l) double gain inverter for grid-connected and photovoltaic applications. ***Electrical Engineering***. doi:10.1007/s00202-024-02282-2
4. **Ravi Anand**, & Mandal, R. K. (2024b). A novel 13-level switched-capacitor step-up inverter with reduced component count. ***International Journal of Circuit Theory and Applications***. doi:https://doi.org/10.1002/cta.4002
5. **Ravi Anand**, Mandal, R. K., & Chodhary, A. (2024). A novel seven-level inverter with high gain and reducing spike current capabilities. ***International Journal of Circuit Theory and Applications***. doi:https://doi.org/10.1002/cta.4200
6. Singh, A. K., Mandal, R. K., & **Ravi Anand**. (2023a). A new 5l sc-based boosting inverter with reduced spike current. ***Electric Power Components and Systems***, 1–16. doi:10.1080/15325008.2023.2287182
7. Singh, A. K., Mandal, R. K., Kumar, A., Choudhary, A., **Ravi Anand**, & Kumar, R. (2023). A novel 13l sc-based inverter with reduced capacitor spike current and high-gain. ***Electric Power Components and Systems***, 1–14. doi:10.1080/15325008.2023.2257693
8. **Ravi Anand**, & Mandal, R. K. (2023). Experimental design and analysis of symmetrical and asymmetrical multilevel inverters. ***Iranian Journal of Science and Technology, Transactions of Electrical Engineering***. doi:10.1007/s40998-023-00602-z
9. Singh, A. K., Mandal, R. K., & **Ravi Anand**. (2023b). A new reduced number of components-based voltage boosting multilevel inverter. ***Electric Power Components and Systems***, *51*(5), 468–479. doi:10.1080/15325008.2023.2177776
10. **Ravi Anand**, & Mandal, R. K. (2022). An efficient and high gain switched-capacitor based multi-level inverter. ***Engineering Research Express***, *4*(3), 035019. doi:10.1088/2631-8695/ac84c6

11 Singh, A. K., Mandal, R. K., Raushan, R., & **Ravi Anand**. (2022). Five-level switched capacitor inverter for photovoltaic applications. ***IETE Technical Review***, *39*(6), 1441–1448. doi:10.1080/02564602.2021.2016074

List of Conference Proceedings

1 Singh, A. K., Mandal, R. K., & **Ravi Anand**. (2022). A new lesser number of components 13-level switched capacitor based inverter. In *2022 ieee 2nd international conference on sustainable energy and future electric transportation (sefet)* (pp. 1–6). doi:10.1109/SeFeT55524.2022.9909445

List of Books and Chapters

1 Singh, A. K., Mandal, R. K., & **Ravi Anand**. (2023c). *Review analysis of cascaded h-bridge and modular multilevel inverters* (N. Priyadarshi, P. Sanjeevikumar, F. Azam, C. Bharatiraja, & R. Singh, Eds.). India: CRC Press, Taylor Francis.

Research Statement

My research focuses on the development of a switched-capacitor based inverter with reduced spikes current. The objective of this research is to address the issue of high spikes current that occurs in traditional switched-capacitor based inverters, which can cause problems such as electromagnetic interference, component failure, and reduced efficiency.
To achieve this objective, the research investigates various techniques for reducing spikes current in switched-capacitor based inverters, including:

- **Optimization of switching patterns:** The research explores different switching patterns to reduce spikes current in switched-capacitor based inverters. This involve optimizing the timing and sequencing of the switching signals to minimize current spikes.
- **Capacitor sizing:** The research investigates the effect of capacitor sizing on spikes current in switched-capacitor based inverters. This involve analyzing the relationship between capacitor size and spikes current, and optimizing the sizing of capacitors to reduce spikes current.
- **Control strategies:** The research explore the use of advanced control strategies to reduce spikes current in switched-capacitor based inverters. This involves developing control algorithms that can regulate the voltage and current waveforms to reduce spikes current.

The research also involves the design and implementation of a prototype switched-capacitor based inverter with reduced spikes current. The performance of the prototype is evaluated through simulation and experimental testing, and compared to traditional switched-capacitor based inverters.
The ultimate goal of this research is to contribute to the development of more efficient and reliable switched-capacitor based inverters that may be used in a variety of applications, including renewable energy systems, electric vehicles, and grid-tied inverters.

Peer Reviewer

IEEE transactions on power electronics: Reviewed papers from 2022.

- Reviewed 12 papers on topics related to multilevel inverters, buck, and boost converters, providing detailed feedback and recommendations.

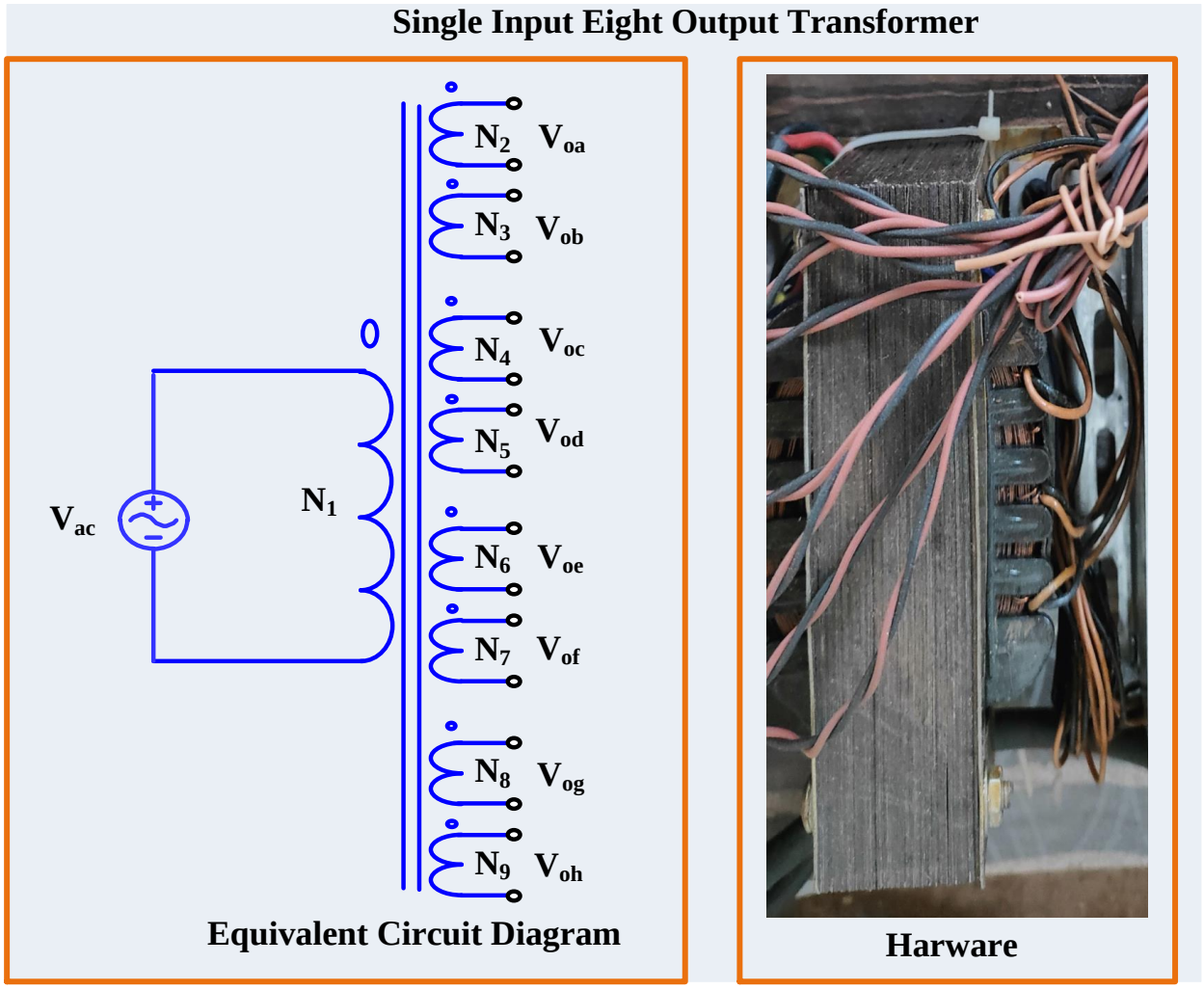
Peer Reviewer (continued)

- **IEEE Journal of Emerging and Selected Topics in Power Electronics**: Reviewed papers from 2022.
    - Reviewed two papers on topics related to multilevel inverters, providing detailed feedback and recommendations.

- **Engineering Research Express**: Reviewed papers from 2022.
    - Reviewed two papers on topics related to boost converter, providing detailed feedback and recommendations.

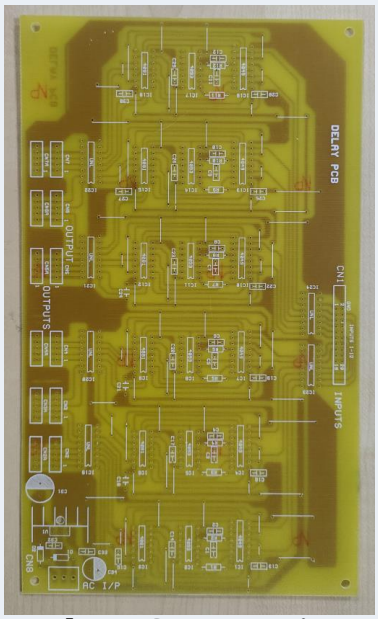
Hardware Design

(a) Transformer design of driver circuits power supply:

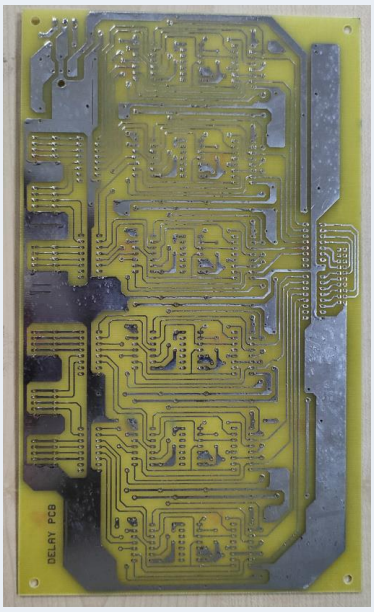


Hardware Design (continued)

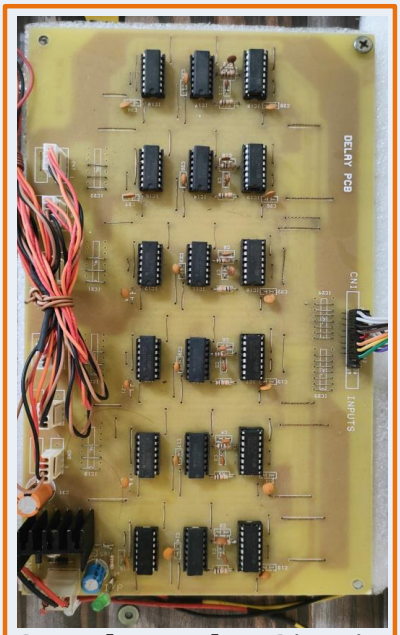
(b) Hardware design of delay circuits:



Delay PCB Top View

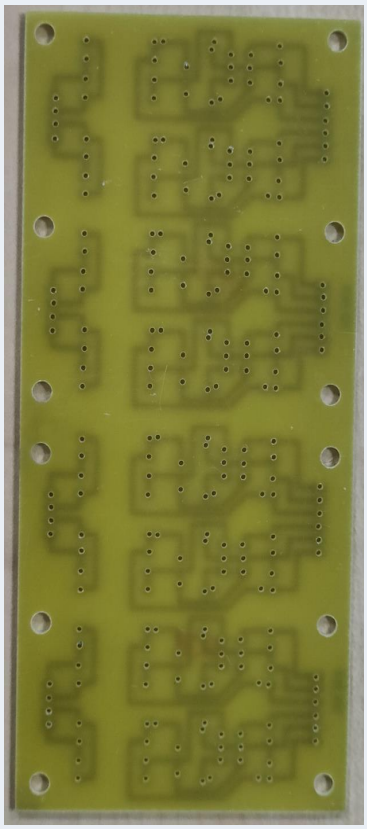


Delay PCB Bottom View

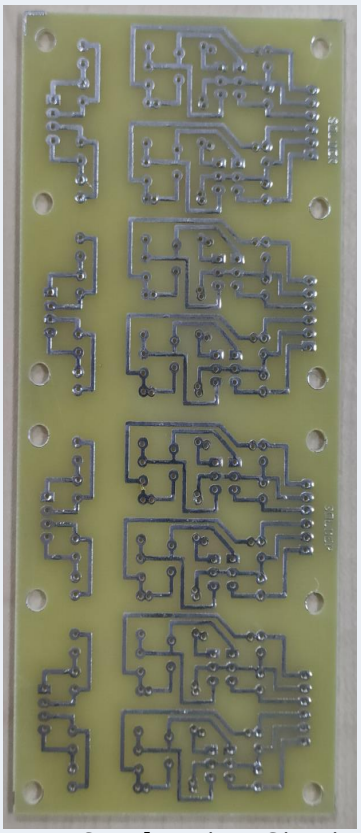


Complete Delay Circuits

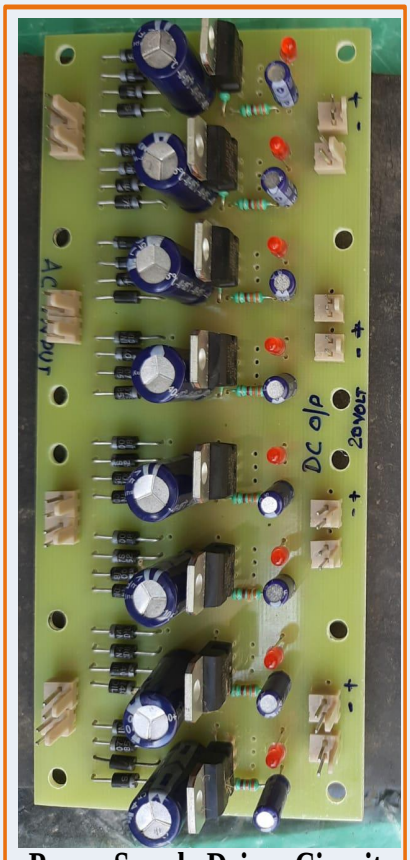
(c)Hardware design of driver power supply circuits:



Power Supply Driver Circuit PCB Top View



Power Supply Driver Circuit PCB Bottom View

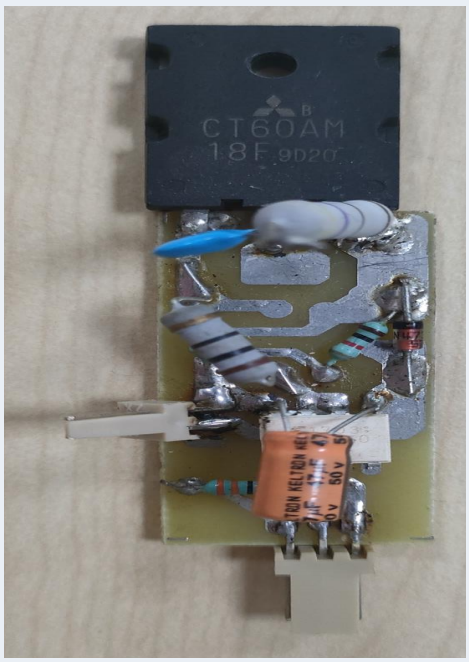


Power Supply Driver Circuits

Hardware Design (continued)

(d)Hardware design of driver circuit with IGBT:

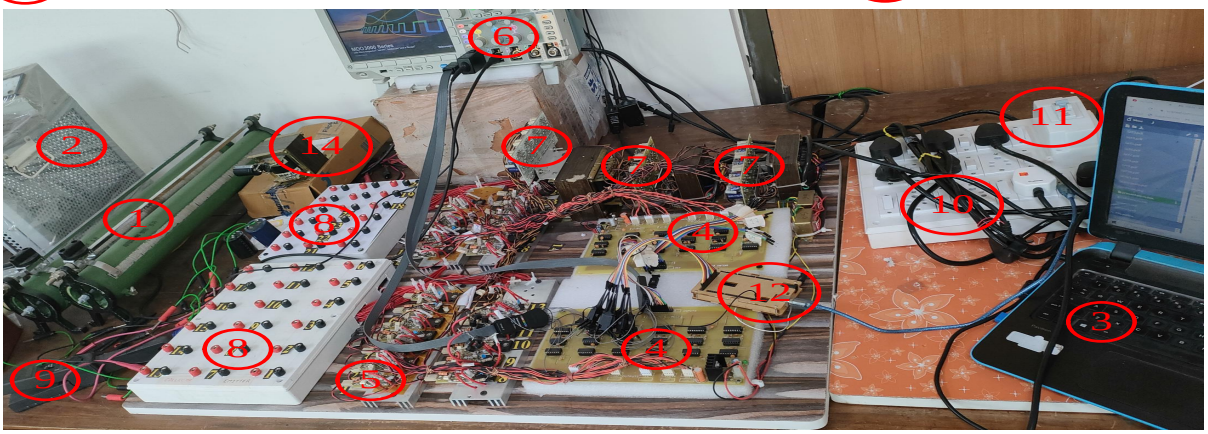
Driver Circuit PCB



Driver Circuit with IGBT

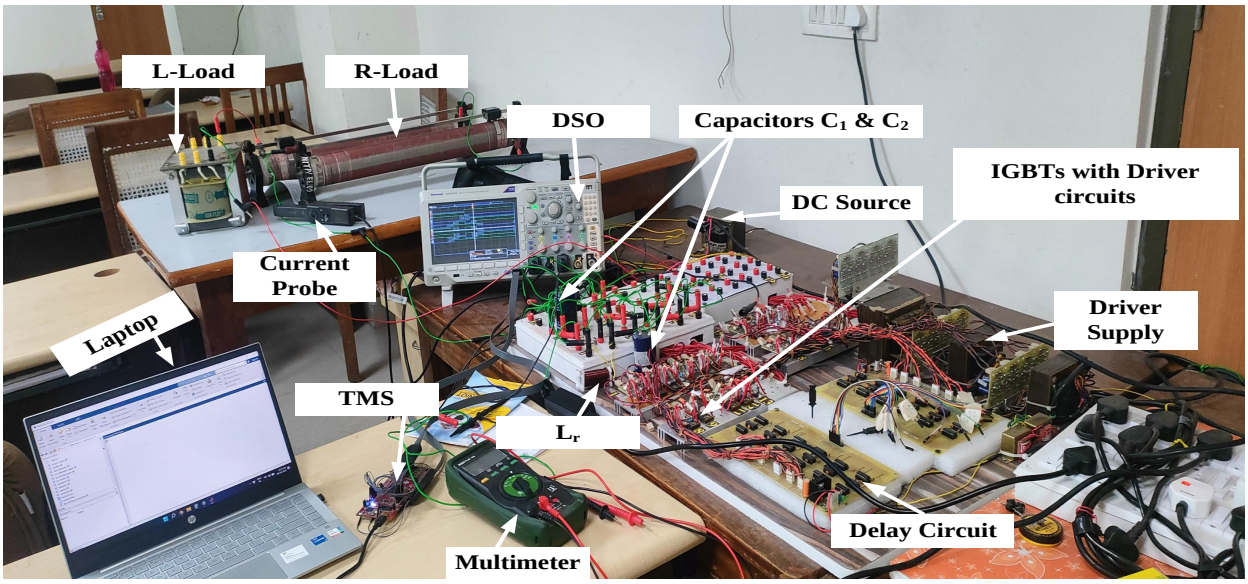
(e) Experimental setup of proposed instruments to test any DC/AC converters:

① Resistive Load ② Inductive Load ③ laptop ④ Delay Circuits
⑤ Driver Circuits and IGBTs ⑥ DSO ⑦ Driver Power Supply
⑧ IGBTs Collector and Emitters Ports ⑨ Current Probe ⑩ AC Power Supply
⑪ MCB ⑫ Arduino Mega 2560 Micro-Controller ⑬ DC Power Supply



Hardware Design (continued)

(f) Experimental prototype of quasi-resonant switched-capacitor based 7-level inverter:



References

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