

Dr. Salman Ahmad

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Profile

Teaching, supervising, assessing and evaluating student activities and progress. Assisting in various departmental activities including accreditations. Conducting research and publishing papers in academic journals. Writing proposals to secure funding for research.

Employment (7+ years)

- **Assistant Professor- IUST, Awantipora, J&K. 2018 - 2020 (TEQIP-III) and 2020-Till Date** (Substantive)
The main tasks are Teaching and supervising of undergraduate and Post graduate students. For some of the courses, prepared syllabus, and established laboratory. Also heading various committees at department and institute level. Completed two research grants and two research grants are undergoing.
- **Lecturer- Debre Berhan University & Arba Minch University, Ethiopia** Recruited under United Nations Development Programme and worked as Lecturer for more than 03 years. The main tasks were Preparation and presentation of lectures, supervision of group work, writing and grading tests and quizzes, grading projects and papers, preparing and grading the final exam for the course and Projects. I have completed one research projects & Headed various key committees in the department.

Education

Doctor of Philosophy (PhD) in Power Electronics from AMU, Aligarh, India. 2020
Thesis: Low Switching Frequency PWM Techniques for Multi phase Voltage Source Inverter
Supervisor's: Prof. Atif Iqbal (Fellow IEEE(USA), Fellow IET(UK)) & Prof. Imtiaz Ashraf (Fellow (IE)).

Master of Technology from Indian Institute of Technology Roorkee, India. 2010-2012
Dissertation: MPPT of Wind Turbine for Induction Generator connected with Grid.
Marks: **86.12%** (Distinction)
Supervisor's: Dr. D.K Khathod & Dr. S.N Singh

Bachelor of Technology (B.Tech) in Electrical Engineering from, AMU, Aligarh. 2006-2010
Project: Fabrication and testing of CIGRE MODEL II for partial discharge studies in high voltage
CPI: **8.636/10** (Honours)

Main Courses Learned

Undergraduate-Power electronics, Power system, analysis, protection and design, Electrical machines and design, Digital and analog electronics, Instrumentation & control, Microprocessor, Signal system, Network analysis and synthesis, Electrical drives, Project management, Numerical techniques, Graduate project, C/C++ Programming, High voltage engineering, EMFT, etc.

Postgraduate-PWM for power converters, Optimization techniques in power converters, Research methodology, Extra high voltage (EHV) AC and DC transmission, Computer simulation in power plants, Electrical distribution system analysis & operation, Hydro electric equipment, Renewable energy systems, Electrical power planning design and management, Advanced mathematics, etc.

Competitive Exams Qualified

Qualified **GATE 2010** and **GATE 2012** in Electrical Engineering with best AIR **918**. AIEEE 2006 with AIR 9735 (out of 0.6 millions) and received offers for B.Tech at NIT Srinagar and NSIT (Now DTU). UPSEET & AMU Engineering. UPPCL and BARC exams for Assistant Engineer Post.

Area of Interest

Pulse width modulation (PWM) control of Power Electronics Converters, Multi level & multi phase Power converter, Application of Optimization and Soft Computing techniques in Power Electronics Converters, Renewable Energy system

Professional Membership

1. Member IEEE USA *Since 2017*
2. Associate Member (IE) India *Since 2016*

Skills

1. **General-** Analytical and problem solving, active listening, good communication and interpersonal skills, Hard working. Good in Research and Articles Writing/Presentation.
2. **Hrdware and Softwares-** Proficient in Matlab, Simulink, FPGA, DSP, MS Office, Mendley, and MS Visio.
3. **Languages-** Fluent in English, Hindi and Urdu. Elementary in Arabic, Sanskrit and Amharic
4. **Online platforms-** Camtasia, Bandicam, Google classroom, Zoom & Googlemeet
5. **Optimization Techniques-** Particle swarm optimization, Genetic algorithm, differential evolution, Ant colony optimization, Artificial neural network.

Short Term Courses Organisation

- Organized a one week Short Term Course (STC) as **Coordinator** on "*FPGA programming in Power and Control applications*", in collaboration with Cranes Software International limited, Bangalore at IUST, Awantipora, J&K from 10-14 September 2018.
- **Co-coordinator** of ATAL-AICTE Sponsored One-Week Faculty Development Programme (FDP) on "*Grid Decarbonization and Distributed Energy Resources to Mitigate Climate Change*" to be held at IUST, Awantipora, J&K from 18-23 December 2023. (**Application Number: 1691751688**)

Research Grants

1. **Principal Investigator.** "*Design and Analysis of quasi-Z source based multilevel dc link inverter for performance enhancement of photovoltaic system*". SEED grant under TEQIP-III, INR 2,00,000 for One Year.(Completed)
2. **Co-Principal Investigator.** "*Development of weather station at IUST for assessing the utilization of renewable energy for space heating, cooling and other sustainable applications*". SEED grant under TEQIP-III, INR 2,00,000 for One Year. (Completed)
3. **Principal Investigator.** "*Design and implementation of reduced switch count multi level inverter for unified power flow controller solar intermittency and power quality*". JKSTIC, DST, J&K, INR 2,74,000 for Two Year.(Ongoing)

4. **Co-Principal Investigator.** “Development of green technology based hybrid space heating for Kashmir valley”. JKSTIC, DST, J&K., INR 4,99,000 for Two Year.(Ongoing)
5. **Principal Investigator.** “Design and development of multiport reduced device count converter and control techniques for renewable energy application”. SURE-SERB, DST, GOI, INR 30,00,000 for Three Year.(Submitted)
6. **Principal Investigator.** “Quasi-Z-Source-Based PV assisted wireless charging system for EV application”. UGC, GOI, GOI, INR 10,00,000 for Two Year.(Submitted)

Research Publications

Book/Chapter

1. A. Iqbal, S. Moinoddin, **Salman Ahmad**, M. Ali, A. Sarwar, and K. N. Mude, “Multiphase converters” , in Power Electronics Handbook. **Elsevier**, USA, 2017, pp. 457-528. (Edited by- **M.H Rashid**). <https://www.elsevier.com/power-e/rashid/978-0-12-811407-0>
Total citations on Google Scholar: 8766
2. **Salman Ahmad**, Atif Iqbal, “Switching Angles Computations using PSO in Selective Harmonics Minimization PWM”, Metaheuristic and Evolutionary Computation: Algorithms and Applications, **Springer Nature-Singapore**, under the series of *Studies in Computational Intelligence* , vol. 96, pp 437-461, ISBN 978-981-15-7571-6. (DOI: https://doi.org/10.1007/978-981-15-7571-6_18)
3. **Salman Ahmad**, A. Iqbal, I. Ashraf, Z.A Ganie “Harmonics Minimization in Multilevel Inverter by Continuous Mode ACO Technique”, Metaheuristic and Evolutionary Computation: Algorithms and Applications, **Springer Singapore**, under the series of *Innovations in Electrical and Electronic Engineering* , vol. 756, edition 1, ISBN 978-981-16-0748-6. 2021, (DOI: 10.1007/978-981-16-0749-3)
4. A.S Anees, **Salman Ahmad**, Z.A Ganie, “Space Heating for Kashmir Valley: Issues, Challenges and Remedies”, Renewable power and sustainable growth, Springer Nature, Singapore, 2021. Electronic ISBN: 978-981-334-080-0.
5. **Salman Ahmad**, F.I Bakhsh and S Padmanbhan, “Multilevel converters: Advances and applications, Scrivener Publishing, Wiley (Book Editing Under progress)
6. A. Iqbal, S. Moinoddin, **Salman Ahmad**, M. Ali, A. Sarwar, and K. N. Mude, “Polyphase Converters and Applications“ Chapter-14, in Power Electronics Handbook (5th Edition). **Butterworth-Heinemann, Elsevier**, USA, 2023, pp. 457-528. (Edited by- **M.H Rashid**). <https://shop.elsevier.com/books/power-electronics-handbook/rashid/978-0-323-99216-9>
7. ZA Ganie, AH Bhat, and **Salman Ahmad**, ”Low switching frequency operation of multilevel converters for high-power applications”, Intelligent Control of Medium and High Power Converters, Publisher IET, 239 (2023): 173.

Peer Reviewed Journals

1. **Salman Ahmad**, Mohammad Meraaj, Atif Iqbal, M.A Alhitmi “Selective Harmonics Elimination in Multilevel Inverter by a Derivative free Iterative Method under Varying Voltage Condition”, **ISA Transaction, Elsevier**, volume 92, pages 241-256. doi.org/10.1016/j.isatra.2019.02.015. **SCI** , Impact Factor = **7.3**.
2. **Salman Ahmad**, Atif Iqbal, Mohammad Ali, Khaleequr Rahman, Ahmed Abdellahi, “A Fast convergent Homotopy Perturbation Method for Solving Selective Harmonics Elimination PWM Problem in Multi Level Inverter”, **IEEE Access**, Vol. 9, 2021. DOI:10.1109/ACCESS.2021.3104184. **SCI**, Impact Factor=**3.9**.

3. **Salman Ahmad**, Al-Hitmi M, Iqal A, Ashraf I, Meraj M, Padmanaban S., “*Low-order harmonics control in staircase waveform useful in highpower application by a novel technique*”, International Transaction on Electrical Energy System, **Wiley**, vol. 29, issue 3. <https://doi.org/10.1002/etep.2769>, **SCI**, Impact Factor = **2.860**.
4. Mohammad Al-Hitmi, **Salman Ahmad**, Atif Iqbal, Sanjeevikumar Padmanaban and Imtiaz Ashraf “*Selective Harmonic Elimination in Wide Range of Modulation Using Modified Newton-Raphson and Pattern Generation Method for Multilevel Inverter*” vol. 11, issue 2, 458,2018. **MDPI-Energies**, Switzerland, 2018; doi:10.3390/en11020458, **SCIE**, Impact Factor=**3.252**.
5. Khaleequr Rahman, Atif Iqbal, M.A Alhitmi, O. Dordevic, **Salman Ahmad**, “*Performance Comparison of SVPWM Techniques in a Dual Matrix Converter Fed Five-phase Open-End Load*”, **IEEE Access**, vol. 7, pg. 12307-12318. DOI: 10.1109/ACCESS.2892514. **SCI**, Impact Factor=**3.252**.
6. **Salman Ahmad**, Khaleequr Rahman, Atif Iqbal,M.A Al-Hitmi, “*Control of Low Order Harmonics in a 3×3 Matrix Converter using Differential Evolution Approach*”, International Transaction on Electrical Energy System, **Wiley**, 2018, vol. 30, issue 1. DOI: 10.1002/2050-7038.12179, SCI indexed, Impact Factor = **2.860**.
7. **Salman Ahmad**, Atif Iqbal, Mohammad Meraj, Imtiaz Ashraf, “*Invasive Weed Optimization for Harmonics Minimization in Symmetrical and Asymmetrical Multilevel Inverter*”, **Energy Reports, Elsevier**, (Accepted). **SCI**, Impact Factor=**6.870**.
8. **Salman Ahmad**, Rahim Uddin, Zahoor Ahmad Ganie, Ahmed Sharique Anees, Farhad Ilahi Bakhsh “*Low frequency operation and dsPIC micro-controller implementation for multilevel quasi Z source inverter in photovoltaic application*”, **Distributed Generation & Alternative Energy Journal, Taylor & Francis**,37(4), 929958. **SCOPUS**.
9. Ahmad Ganie, Z., Hamid Bhat, A., & Ahmad, S. , “*A novel adaptive invasive weed optimization technique and least square regression for harmonics minimization in standalone PV applications*”, **International Journal of Circuit Theory and Applications, Wiley**, (Accepted), 2022. **SCI**, Impact Factor=**2.378**.
10. Ahmad Ganie, Z., Hamid Bhat, A., & Ahmad, S. , “*Wide Band Solution and Sensitivity Analysis for Lower Order Harmonics Control in Multilevel Converter*”, **International Journal of Power Electronics, Inderscience publishers**,2022, (Accepted). **SCOPUS**.
11. K. Rahmane, Z., A. Sarwar, M. Tariq... & Ahmad, S. , “*Experimental analysis of advanced control technique for a fivephase direct matrix converter based on space vector PWM*“, **IET Power Electronics (2023)(Accepted)**. **SCI**, IF=**2.112**.

Peer Reviewed Conferences (Presented/Attended)

1. Ganie, Z. A., Bhat, A. H., & **Salman Ahmad**, (2022, August), “*Harmonics Minimization in Wide Modulation Range Using Improved Differential Evolution Optimization Technique and Hardware Validation*”, in 2022 2nd Asian Conference on Innovation in Technology (ASIAN-CON) (pp. 1-6). IEEE.
2. Ganie, Z. A., Bhat, A. H., & **Salman Ahmad**, (2022, May), “*Low Switching Frequency Operation of a Two-Level Voltage Source Inverter Using Imperialist Competitive Algorithm and Hardware Realization*”, in (STPES), NIT Srinagar, (pp. 1-6), IEEE.
3. Ahraz Moon, Shabana Mehruz and **Salman Ahmad & Salman Ahmad**, (2022, May), “*Design and Implementation of SEPIC Converter for PV System Based Smart Home Application*”, in (STPES), NIT Srinagar, (pp. 1-6), IEEE.

4. **Salman Ahmad**, I. Khan, A. Iqbal, S. Rahman, “A Novel Pulse Width Amplitude Modulation for Elimination of Multiple Harmonics In Asymmetrical Multilevel Inverter”, IEEE Texas Power and Energy Conference, Texas A& M University, USA. February 2-5, 2021.
5. **Salman Ahmad**, A. Iqbal, I. Asraf, Z.A, Ganie “Harmonics Minimization in Multilevel Inverter by Continuous Mode ACO Technique”, ICEEE 2021, University of Malaya, Malaysia. January 2-3, 2021.
6. **Salman Ahmad**, Zahoor Ahmad Ganie, Rahimuddin, “Close Loop Control of quasi Z-Source Inverter in Grid Connected PV System”, IEEE UPCON, AMU Aligarh, India. November 8-10 2019.
7. Manita Kumari, Mohammad Ali, **Salman Ahmad**, Imtiaz Ashraf, Atif Iqbal, Mohammad Tarique “Genetic Algorithm based SHE-PWM for $1 - \phi$ and $3 - \phi$ Voltage source inverters ”, IEEE, ICPECA, JMI Delhi, India. November 16-17 2019.
8. **Salman Ahmad**, Zahoor Ahmad Ganie, Imtiaz Ashraf, Atif Iqbal, “Harmonics minimization in 3-level waveform and its FPGA realization”, IEEE CIPECH, KIET, India. November 1-2 2018. DOI: 10.1109/CIPECH.2018.8724136.
9. **Salman Ahmad**, Atif Iqbal, Imtiaz Ashraf, M.A Al-Hitmi, “Selected Harmonics Elimination in Multilevel Inverter Using Improved Numerical Technique”, IEEE CPE-PWERENG, Doha, Qatar April 10-12 2018. DOI: 10.1109/CPE.2018.8372500.
10. **Salman Ahmad**, Atif Iqbal, Imtiaz Ashraf, R. Alammari, “SHE PWM for Multilevel Inverter Using Modified NR and Pattern Generation for Wide Range of Solutions”, IEEE CPE-PWERENG, Doha, Qatar. April 10-12 2018. DOI: 10.1109/CPE.2018.8372498.
11. **Salman Ahmad**, Antwan Elias Hesny, Atif Iqbal, Saad Ahmed Aly, Syed Rahman, “Design and Development of a Contactless Battery Charger for Electric Vehicles”, International Conference on Emerging Trends in Engineering & Technology Management, NIT Hamirpur. Dec. 16-18, 2017, 102-107, Vol 1, 978-93-86724-30-4.
12. **Salman Ahmad**, Atif Iqbal, Imtiaz Ashraf, Mohd. Tariq, “Low Switching Frequency Modulation for a 3-Level Grid Tied NPC Inverter in Solar PV Application”, ICCPEAT 2017, Pondicherry. February 24-25 2017.
13. MD Farman, **Salman Ahmad**, Afroz Alam, M.P Sharma, “Chemical analysis of insulator contaminants and reliability improvement of T&D line for smart operation of grid under chemically polluted environment”, Sustainable Energy and Intelligent Systems (SEIS-CON 2011), IET Chennai, 2nd International conference, pp.539-544, 20-22 July 2011. DOI: 10.1049/cp.2011.0420.
14. **Salman Ahmad**, M.D Farman, “Power quality issues of distributed generation in distribution Network and its impact on system Power Loss and voltage profile”, 2nd International Conference on emerging trends in Engineering and Technology, TMU Moradabad. April 12-13.
15. **Salman Ahmad**, S.N. Singh, “A Review of MPPT Control Methods in Wind Energy Conversion Systems”, International Conference on emerging trends in Engineering and Technology, TMU Moradabad. April 6-7 2012.

Manuscript Under Review/Preparation

1. **Salman Ahmad**, Atif Iqbal, Imtiaz Ashraf and Mohammed Meraj “A Novel Method for Harmonics Minimization in Symmetrical and Asymmetrical Multilevel Inverter” **IEEE Transaction on Industrial Electronics** (Manuscript ID: 20-TIE-3147)

2. **Salman Ahmad**, Atif Iqbal, Imtiaz Ashraf, “*Wide Band Solution and Sensitivity Analysis for Low Order Harmonics Minimization in Multilevel Inverter By Differential Evolution Method*” EPE Journal: European Power Electronics and Drives, **Taylor & Francis**. **SCI**, Impact Factor=**0.933**).
3. **Salman Ahmad**, Atif Iqbal and Imtiaz Ashraf “*Low order harmonics torque minimization in voltage source inverter fed IM drives*” **IEEE Transaction on circuits and systems**.
4. **Salman Ahmad**, Irfan Khan, Atif Iqbal and Syed Rahman, “*A Novel Pulse Width Amplitude Modulation for Elimination of Multiple Harmonics In Asymmetrical Multilevel Inverter*”, **IEEE Transaction on Industrial Applications**

Editor/Session Chair/Papers presented in International Conferences

- **Editor**, Frontiers in Energy Research journal **SCI**, **IF=3.4** (<https://www.frontiersin.org/journals/energy-research/editors>).
- Chaired a session at the IEEE Energy Conversion Congress and Exposition-Asia (IEEE ECCE-Asia 2021) held from 24th to 27th May, 2021 in **Singapore** (Virtual Conference).
- Chaired two sessions at the IEEE International Conference on Sustainable Technology For Power And Energy Systems 2022 held from 4th to 6th July, 2022 in **NIT Srinagar**.
- Chaired one session at 2nd IEEE Asian Conference on Innovation in Technology (ASIANCON) from 26-28 Aug, 2022, held in Pune, India. .
- Presented research articles in various international conferences organised in India, USA, Qatar, Malaysia, Ethiopia etc..

Research Citations

1. Google Scholar: <https://scholar.google.com/citations?hl=en&authuser=1&user=fIWV9e4AAAAJ>
2. Researchgate: <https://www.researchgate.net/profile/Salman-Ahmad27>
3. ORCID ID: 0000-0003-0281-8220
4. Scopus ID: 57202601204, Web of Science Researcher ID: ABG-7771-2020

Short Term Course/Workshop

1. **STTP**-Digital Signal Processor: An Introduction with Code Composer Studio and PSIM Software
14-16, 23-24 April, 2022
Organised by Advanced Power Electronics Laboratory (APEL) **NIT Surat**
2. **FIP**-” Participated in One month faculty induction programme Dec 28, 2020- Feb. 02, 2021
Sponsored by UGC and conducted by **UGC-HRDC, JMI, New Delhi**
3. **FDP**- Successfully completed 12 week NPTEL-AICTE Faculty Development Programme on **Design of Photovoltaic System**
Sep-Dec, 2020
Conducted by *Indian Institute of Sciences Bangalore* **Prof. L. Umanand**
4. **STC**- Digital Signals Controllers for Control of Power Electronic Converters and Applications (Series-I)
Dec 14-19, 2020
AICTE sponsored 6 days short term course by **SCET, Surat**
5. **STC**-Advancements in Optimization of Power Drives and Control System Nov 16-20, 2020
One week short term course by **NIT Hamirpur, India**

6. **STC**-Transition in Power Electronics towards Flexible Micro-Grids *Oct 19-23, 2020*
One week short term course by **NIT Delhi, India** (under NAMPET)
7. **STTP**-Application of artificial intelligence in electrical energy systems *Aug 17- Aug 21, 2020*
One week short term training programme at **NIT Srinagar, India**
8. **FIP**-Advanced Pedagogy and Digital Tools *May 13- May 17, 2019*
One week Faculty Induction Programme at **IIT Kanpur**
9. **FDP** on Advanced Controller Design for Power Electronic Converters”, organised by, DOEE, Mahendra Engineering College, Namakkal, *Mar 16-22, 2017.*
10. **QIP**-Embedded system design for Power Converters *Aug 6-Aug 10, 2018*
One week short term course at **IISC Bangalore**
11. **Faculty Induction Programme** *Jan 29-Feb 02, 2018*
One week Faculty development programme at **IIT Kanpur**
12. **GIAN**-Emerging Electrical Energy Storage Applications *Dec. 11- Dec. 16, 2017*
One week GIAN Course by MHRD at **NIT Hamirpur, HP**
13. **GIAN**-Advanced sliding mode control and estimation for real complex system *Oct. 24-27, 2017*
One week GIAN Course by MHRD at **IIT Roorkee**
14. **GIAN**-Advances in power electronics & renewable energy sources *Feb 06-10, 2017*
One week GIAN Course by MHRD at **JMI, New Delhi**
15. **Workshop**-Nature inspired optimization techniques and research paper writing by Latex *Mar 16-22, 2017.*
One week workshop at **AMU, Aligarh**
16. **Workshop**-Big Data and Soft Computing: Techniques and Applications *Oct 05-09, 2016*
One week workshop at **AMU, Aligarh**
17. **Workshop**-Digital Signal Controllers and FPGA for Power Electronics *Aug 24-30, 2016.*
One week workshop at **AMU, Aligarh**
18. **Short Term Course**-Recent Advances in Power Electronics for Smart Grid *Mar 3-5, 2016.*
One week workshop at **IIT Patna** (NAMPET)

Weibnars Attended

1. Attended one week weibinar series organised by IEEE-PELS IAS-Delhi Section on “Understanding Power System Simulation Concepts through Case Studies” *2020*
2. “Smart Inverters for Grid Integration of Renewable Energy” *2020*
3. Emerging Trends and Research Opportunities in Electric Vehicles by *IEEE* *2020*
4. “Accelerate Research Planning using Elsevier’s Scopus, ScienceDirect & Mendeley” *2020*
5. Motivation for Magnetic Gears and Magnetically Geared Machines by *IEEE* *2017*
6. Powering Critical Loads: State-of-the-Art Based on Taiwan Experience by *IEEE* *2017*
7. Electrical Injury Drills: Approaches, Learnings, and Best Practices *IEEE* *2017*

Committees/Administrative

- Gate coordinator, Library coordinator, Examination coordinator, Start-up coordinator, Power electronics laboratory in-charge, member departmental BOS committee.

Student Projects and Research Scholars Supervision

- Jointly supervised a Ph.D research scholar from NIT Srinagar (Completed in 2024).
- Supervising a Ph.D research scholar at IUST (Ongoing).
- Jointly supervising a Master Dissertation from NIT Srinagar (Ongoing).
- UG students project supervised-28

Awards and Honors

1. 1st prize in GIAN organized by JMI & MHRD, Govt. of India *2017*
2. 1st prize in QUIZ organized by ministry of Petroleum, Govt. of India *2011*
3. 1st prize in QUIZ organized by IIT Roorkee *2012*
4. Merit-Cum Means Fellowship by MHRD, Govt. of India *2008-2011*
5. Maulana Azad Fellowship by UP Government *2007-2008*
6. Non-Net Fellowship from UGC, Govt. of India *2015-2017*
7. MHRD Fellowship from Govt. of India *2010-2012*

Community & Research Activities

1. IEEE Transaction on Industrial Electronics *Reviewer since 2015*
2. IEEE Transaction on Power Electronics *Reviewer since 2016*
3. IEEE Transaction on Industry Application *Reviewer since 2016*
4. IEEE Transaction on Energy conversion *Reviewer since 2019*
5. IET Power Electronics *Reviewer since 2017*
6. ISA Transaction, Elsevier *Reviewer since 2018*
7. IEEE Access *Reviewer since 2018*
8. ITEES, Wiley *Reviewer since 2017*
9. IEEE IECON, IAS, PEDES *Reviewer since 2016*

References

1. Dr. Atif Iqbal, Fellow IEEE (USA), Fellow IET (UK)
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3. Dr. D.K Khatod, Member IEEE
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