Brief Resume of **Santanu Kapat, Ph.D.**

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Google Scholar page
Web of Science page
Scopus page

PROFESSIONAL EXPERIENCE

- Dec. 2019 – present: **Associate Professor**, Dept. of Electrical Engineering, **IIT Kharagpur**
- Jul. 2019 – Nov. 2019: **Associate Professor**, Dept. of Electrical Engineering, **IIT Delhi (On LIEN from IIT Kharagpur)**
- Mar. 2018 – Jul. 2019: **Associate Professor**, Dept. of Electrical Engineering, **IIT Kharagpur**
- Aug. 2011 – Mar. 2018**: Assistant Professor**, Dept. of Electrical Engineering, **IIT Kharagpur**
- Aug. 2010 – Aug. 2011: **Research Engineer**, **GE Global Research**, Bangalore, India
- Aug. 2009 – Jul. 2010: **Visiting Scholar**: Dept. of ECE., **University of Illinois (UIUC),** USA

AWARDS/RECOGNITIONS

- **Faculty Excellence Award (Associate Professor),** IIT Kharagpur, **2022**
- **Qualcomm Faculty Award** in 2022 from Qualcomm (link)
- **Editor, IETE Technical Review,** from 2022 onwards (link)
- **Highest number of papers in APEC 2022 worldwide (jointly with Virginia Tech., USA)**
- **Invited Webinar,** Invited by IEEE Power Electronics Society, IEEE**, December 2021**
- **Among top 2% Global Scientists** in Electrical and Electronics Engineering (jointly prepared by Stanford University and Elsevier publisher)**, 2020, 2021**
- **NPTEL course** "Digital Control in Switched Mode Power Converters and FPGA-based Prototyping" is listed in the NPTEL domain elective list after first run, 2022 (link)
- **NPTEL course** "Control and Tuning Methods in Switched Mode Power Converters" is listed in the NPTEL domain elective list after first run, 2021 (link)
- **Associate Editor**, *IEEE Transactions on Power Electronics* since 2015 onward (link)
- **Associate Editor**, *IEEE Journal of Emerging and Selected Topics in Power Electronics since 2020 (link)*
- **Associate Editor**, *IEEE Transactions on Circuits and Systems II: Express Briefs* since 2018 (link)
- **INSA Medal for Young Scientist** in 2016 from Indian National Science Academy (link)
- **INAE Young Engineering Award** in 2016 from Indian National Academy of Engineering (link)

- **Session Chair**, IEEE APEC, Long Beach, California, USA, March, 2016
- **DAE Young Scientist Research Award** from Department of Atomic Energy in 2014

INDUSTRY ADVANCED TRAINING PROGRAM DEVELOPMENT

Industry name	Training course title	Hours	Time
Qualcomm	Modeling Techniques and Validation Methodologies in Closed-Loop Switched Mode Power Converter Products	**40**	June/July 2022
STMicroelectronics	Modeling, Analysis and Design of Fixed-Frequency Control Methods in DC-DC Converters and MATLAB based Design Automation	**40**	January – June, 2022
HCL Technologies	Digital Control Techniques in Switched Mode Power Converters	**48**	April – July 2021
Qualcomm	Control Techniques in Switched Mode Power Converters	**30**	May – July 2021
STMicroelectronics	Power Management Circuits, Modelling, Control, Analysis, and Design	**40**	March 2020
NXP Semiconductor	Modeling and Control of Switched Mode Power Converters	**20**	2018-2019

NPTEL ONLINE CERTIFICATION COURSE DEVELOPMENT

- **Developing a new NPTEL online certification course on** "Digital Control of Switched Mode Power Converters and FPGA-based Prototyping", started in **July, 2022.** YouTube link.
- **Developed an NPTEL online certification course on** "Control and Tuning Methods in Switched Mode Power Converters", YouTube link.

EDUCATION

- **Ph.D.** Electrical Engineering IIT Kharagpur 2010
- **M.Tech.** Electrical Engineering IIT Kharagpur 2006
- **B.E.** Instrumentation Technology VTU, Belgaum 2003

RESEARCH INTERESTS and STUDENT GUIDANCE

- **Research Interests**: High-frequency (HF) switched mode power converters (SMPC); digital control, nonlinear control, nonlinear dynamics; mixed-signal power management circuits; GaN and SiC-based HF SMPC; Applications to portable devices, data center, AI workloads, ADAS, 48V-to-direct PoL converters, fast battery chargers, LED driving, DC grid, power converters for automotive, and BMS.

- **PhD student guidance**:

Sl. No.	Student Name	Present affiliation	Joining Year	Status
1.	Bipin Chandra Mandi	Assist. Prof., **IIIT Naya Raipur**	Autumn 2011	**Degree awarded** in 2017
2.	Amit Kumar Singha	Assist. Prof., **IIT Mandi**	Autumn 2012	**Degree awarded** in 2017
3.	Vedula Inder Kumar	Postdoctoral fellow, UC Boulder	Autumn 2014	**Degree awarded** in 2019
4.	K. Hariharan	Specialist, Tata Elxsi, India	Spring 2013	**Degree awarded** in 2021
5.	Rabishankar Roy	Research Engineer, GE, Bangalore	Autumn 2015	**Degree awarded** in 2020
6.	Somnath Khatua	Research Engineer, GE, Bangalore	Autumn 2015	Expected to submit thesis by 2022
7.	Mrinmoy Bhowmik	Assistant Professor, UPES, Dehradun	Spring 2016	**Completed** registration seminar
8.	Prantik Majumdar	Research Scholar, IIT Kharagpur	Spring 2017	**Completed** registration seminar
9.	Ruturaj	Research Scholar, IIT Kharagpur	Spring 2017	**Completed** registration seminar
10.	Dipayan Chatterjee	Research Scholar, IIT Kharagpur	Spring 2019	**Completed** PhD coursework
11.	Anirban Nanda	Research Scholar, IIT Kharagpur	Autumn 2020	**Completed** PhD coursework
12.	Faraz Ahmad	Research Scholar, IIT Kharagpur	Spring 2020	**Completed** PhD coursework
13.	Gopi Chilukuri Reddy	Research Scholar, IIT Kharagpur	Autumn 2021	Yet to complete PhD coursework
14.	Teja Golla	Research Scholar, IIT Kharagpur	Autumn 2021	Yet to complete PhD coursework
15.	Calvin Paul	Research Scholar, IIT Kharagpur	Autumn 2022	Yet to start PhD coursework

- **M.Tech/M.S. student guidance**: Successfully completed **22 M.Tech guidance and 2 MS; 1 M.Tech** and **1 MS guidance** ongoing

RESEARCH & DEVELOPMENT INITIATIVES

- ❖ Developed **Embedded Power Management Lab**
- ❖ Initiated **High Performance Digital Control** Research in India
- ❖ Received more than INR 50 million fund (nearly $670k)
- ❖ Collaboration with **STMicroelectronics, Qualcomm, Texas Instruments, GE Global Research, NXP Semiconductor, HCL Technologies**

  For details about the project: visit http://www.iitkgp.ac.in/department/EE/faculty/ee-skapat

THEORY COURSES DEVELOPED/TAUGHT at IIT Kharagpur

- Introduced a course **Embedded Control of Switching Power Converters** in 2014
- M. Tech courses taught: **Nonlinear Control, Control Theory, Digital Control, Estimation of Signals and Systems, Embedded Control of Switching Power Converters (developed this course), Electric Vehicle, Programmable and Embedded Systems**
- B.Tech courses taught: **Control System Engineering (presently teaching), Electrical Technology, Embedded Systems**

SUMMARY RESEARCH PUBLICATIONS/PATENTS

	Single-authored publications	Multi-authored publications	Total
Journal publications	**5**	**28**	**33**
Conference papers	**14**	**40**	**62**

- Research profile: Google scholar Scopus Researchgate
- Complete list of publication given below

Journal publications

[1] S. Khatua, D. Kastha and S. Kapat, "A Dual Active Bridge Derived Hybrid Switched Capacitor Converter Based Two-Stage 48 V VRM," *IEEE Trans. Power Electron.*, vol. 36, no. 7, pp. 7986-7999, July 2021.

[2] A. Acharya, V. I. Kumar and S. Kapat, "Dynamic Bus Voltage Reconfiguration in a Two-Stage Multiphase Converter for Fast Transient," *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 9, no. 1, pp. 48-57, Feb. 2021

[3] R. Roy and S. Kapat, "Input Filter-Based Ripple Injection for Mitigating Limit Cycling in Buck Converters Driving CPL," *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 9, no. 2, pp. 1315-1327, April 2021

[4] R. Roy and S. Kapat, "Discrete-Time Framework for Analysis and Design of Digitally Current-Mode-Controlled Intermediate Bus Architectures for Fast Transient and Stability," *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 8, no. 4, pp. 3237-3249, Dec. 2020.

[5] S. Khatua, D. Kastha and S. Kapat, "A New Single-Stage 48-V-Input VRM Topology Using an Isolated Stacked Half-Bridge Converter," *IEEE Trans. Power Electron.,* vol. 35, no. 11, pp. 11976-11987, Nov. 2020

[6] S. Kapat and P. T. Krein, "A Tutorial and Review Discussion of Modulation, Control and Tuning of High-Performance DC-DC Converters based on Small-Signal and Large-Signal Approaches" **(download)**, *IEEE Open Journal of Power Electronics,* vol. 1, pp. 339 - 371, Aug. 2020.

[7] R. Roy, I. Kumar, and S. Kapat, "Ripple Voltage Injection to Mitigate Limit Cycle in Digitally Controlled Intermediate Bus Architectures", *IEEE Trans. Power Electron.,* vol. 35, No. 3, pp. 3127 - 3138, Mar. 2020.

[8] K. Hariharan, S. Kapat, and S. Mukhopadhyay, "Constant Off-Time Digital Current-Mode Controlled Boost Converters with Enhanced Stability Boundary" **(download)**, *IEEE Trans. Power Electron.,* vol. 34, No. 10, pp. 10270 - 10281, Oct. 2019.

[9] S. Kapat, "Sampling-Induced Border Collision Bifurcation in a Voltage-Mode DPWM Synchronous Buck Converter" **(download)**, *IEEE Trans. Cir. Syst. II,* vol. 66, No. 6, pp. 1048 - 1052, June 2019.

[10] K. Hariharan, S. Kapat, and S. Mukhopadhyay " Constant On/Off-Time Hybrid Modulation in Digital Current-Mode Control using Event-Based Sampling," **(download)**, *IEEE Trans. Power Electron.,* vol. 34, No. 4, pp. 3789 - 3803, April 2019.

[11] K. Hariharan and S. Kapat, "Near Optimal Controller Tuning in a Current-Mode DPWM Boost Converter in CCM and Application to a Dimmable LED Array Driving," **(download)**, *IEEE Journal of Emerging and Selected Topics in Power Electronics,* vol. 7, No. 2, pp. 1031 - 1043, June 2019.

[12] B. C. Mandi, S. Kapat, and A. Patra, "Unified Digital Modulation Techniques for DC-DC Converters over a Wide Operating Range: Implementation, Modeling, and Design Guidelines " **(download)**, *IEEE Trans. Cir. Syst. I,* vol. 65, No. 4, pp. 1442 - 1453, Apr. 2018.

[13] A. K. Singha and S. Kapat, " Analyzing the Effects due to Discontinuous Output-Voltage Ripple in a Digitally Current-Mode Controlled Boost Converter, " **(download)**, *IET Power Electron.,* vol. 11, No. 6, pp. 1055 - 1065, Jun. 2018.

[14] A. K. Singha, S. Banerjee, and S. Kapat, " Enhanced Stability Caused by One-Cycle Delay in a Digital Current-Mode Controlled Buck Converter, " **(download)**, *IEEE Trans. Cir. Syst. II,* vol. 65, No. 12, pp. 1979 - 1983, Dec. 2018.

[15] S. Kapat and I. Kumar, "Single-Inductor Multi-Output-Level Buck Converter for Reducing Voltage-Transition Time and Energy Overheads in Low Power DVS-Enabled Systems " **(download)**, *IEEE Trans. Power Electron.,* vol. 33, No. 3, pp. 2254 - 2266, Mar. 2018.

[16] S. Kapat, " Parameter-Insensitive Mixed-Signal Hysteresis-Band Current Control for Point-of-Load Converters with Fixed Frequency and Robust Stability," **(download)**, *IEEE Trans. Power Electron.,* vol. 32, No. 7 pp. 5760 - 5770, Jul. 2017.

[17] K. Hariharan and S. Kapat, "Need for Variable Frequency Control in DC-DC Switching Converters – Challenges and Opportunities using Digital Implementation," **(download)**, Early access, *Proceedings of the Indian National Science Academy,* 2017.

[18] I. Kumar and S. Kapat, "Power Management Architectures for Dynamic Voltage Scaling (DVS) Applications – Challenges and Opportunities," **(download)**, *Annals of the Indian National Academy of Engineering,* vol. XIV, pp. 197 - 207, April 2017.

[19] A. K. Singha and S. Kapat, "A Unified Framework for Analysis and Design of a Digitally Current-Mode Controlled Buck Converter," **(download)**, *IEEE Trans. Cir. Syst. I,* vol. 63, No. 11, pp. 2098 - 2107, Nov. 2016.

[20] I. Kumar and S. Kapat, "Unified Digital Current Mode Control Tuning with Near Optimal Recovery in a CCM Buck Converter," **(download)**, *IEEE Trans. Power Electron.,* vol. 31, No. 12 pp. 8461 - 8470, Dec. 2016.

[21] S. Kapat, "Reconfigurable Periodic Bi-frequency DPWM with Custom Harmonic Reduction in DC-DC Converters," **(download)**, *IEEE Trans. Power Electron.,* vol. 31, No. 4, pp. 3380 - 3388, Apr. 2016.

[22] S. Kapat, B. C. Mandi, and A. Patra, "Voltage-mode Digital Pulse Skipping Control of a DC-DC Converter with Stable Periodic Behavior and Improved Light-load Efficiency," **(download)**, *IEEE Trans. Power Electron.,* vol. 31, No. 4, pp. 3372 - 3379, Apr. 2016.

[23] S. Kapat, "Configurable Multi-mode Digital Control for Light Load DC-DC Converters with Improved Spectrum and Smooth Transition," **(download)**, *IEEE Trans. Power Electron.,* vol. 31, No. 3, pp. 2680 - 2688, Mar. 2016.

[24] A. K. Singha, S. Kapat, S. Banerjee, and J. Pal, "Nonlinear Analysis of Discretization Effects in a Digital Current Mode Controlled Boost Converter," **(download)**, *IEEE J. Emerg. Selected Topics Cir. Systs.* , vol. 5, No. 3, pp. 336 - 344, Sept. 2015.

[25] S. Kapat, "Selectively Sampled Sub-harmonic Free Digital Current Mode Control Using Direct Duty Control" **(download)**, *IEEE Trans. Cir. Syst. II,* vol. 62, No. 3, pp. 311 - 315, March 2015.

[26] S. Kapat, P. Shenoy, and P. Krein, "Near Null Response to Large Signal Transients in an Augmented Buck Converter: A Geometric Approach" **(download)**, *IEEE Trans. Power Electron.*, vol. 27, No. 7, pp. 3319 - 3329, July 2012.

[27] S. Kapat and P. Krein, "Formulation of PID Control for DC-DC Converters Based on Capacitor Current: A Geometric Context" **(download)**, *IEEE Trans. Power Electron.*, vol. 27, No. 3, pp. 1424 - 1432, March 2012.

[28] S. Kapat and P. Krein, "Improved Time Optimal Control of a Buck Converter Based on Capacitor Current" **(download)**, *IEEE Trans. Power Electron.*, vol. 27, No. 3, pp. 1444 - 1454, March 2012.

[29] S. Kapat, S. Banerjee, and A. Patra, "One-dimensional Discontinuous Map Analysis of DC-DC Converters Under Voltage Controlled Pulse Skipping Modulation" **(download)**, *Int. J. Bifur. Chaos*, World Scientific Journal, vol. 22, No. 3, March 2012.

[30] S. Kapat, A. Patra, and S. Banerjee, "Improving Load Regulation in Current Mode Control through Inductor Current Filtering" **(download)**, *Int. J. Power Electron.*, Vol. 4, No. 1, pp. 71 - 93, January 2012.

[31] S. Kapat, A. Patra, and S. Banerjee, "Achieving Monotonic Variation of Spectral Composition in DC-DC Converters using Pulse Skipping Modulation" **(download)**, *IEEE Trans. Cir. Syst. I*, vol. 58, No. 8, pp. 1958 - 1966, August 2011.

[32] S. Kapat, S. Banerjee, and A. Patra, "Discontinuous Map Analysis of a DC-DC Converter Governed by a Pulse Skipping Modulation" **(download)**, *IEEE Trans. Cir. Syst. I*, vol. 57, no. 7, pp. 1793 - 1801, July 2010.

[33] S. Kapat, A. Patra, and S. Banerjee, "A Current Controlled Tri-State Boost Converter with Improved Performance through RHP Zero Elimination" **(download)**, *IEEE Trans. Power Electron.*, vol. 24, no. 3, pp. 776 - 786, March 2009.

Conference publications

[1] S. Kapat, A. Singha, and A. Acharya, "A Hardware-Enabled Tool for Nonlinear Analysis of Digitally Controlled High-Freq. DC-DC Converters", Accepted for presentation in *IEEE IECON*, Brussel, Belgium, October, 2022.

[2] T. Golla, R. Talukdar, and S. Kapat, "Enhanced Stability with Fast Transient Performance in Digitally Current Mode Controlled Multi-phase Buck Converters using Event-based Sampling", Accepted for presentation in *IEEE IECON*, Brussel, Belgium, October, 2022.

[3] S. Kapat, and A. Nanda, "Clock Shift and Sampling Delay Effects on Stability in Digitally Controlled Cascaded DC-DC Converters", Accepted for presentation in *IEEE IECON*, Brussel, Belgium, October, 2022.

[4] M. Bhowmik, D. Chatterjee, K. Hariharan, and S. Kapat, A. Bhattacharya, "State Feedback Design Approach for Fast Recovery Digitally Current Mode Controlled Boost Converters", Accepted for presentation in *IEEE IECON*, Brussel, Belgium, October, 2022.

[5] S. Kapat, "Chattering-Free Event-Trigger Fast Recovery Stable Digital Sliding Mode Control in DC-DC Converters", in proc. *IEEE APEC*, Houston, Texas, USA, March 2022.

[6] S. Kapat, "PID Controller Tuning of Voltage Mode Controlled Buck Converter for Fast Recovery Up to Slew Limit", in proc. *IEEE APEC*, Houston, Texas, USA, March 2022.

[7] S. Kapat, "Real-Time Reconfiguration in Digital Current Mode Control for Fast Transient with Robust Stability", in proc. *IEEE APEC*, Houston, Texas, USA, March 2022.

[8] I. Kumar and S. Kapat, "Per-Core Configurable Power Supply for Multi-Core Processors with Ultra-Fast DVS Voltage Transitions", in proc. *IEEE APEC*, Houston, Texas, USA, March 2022.

[9] S. Khatua, D. Kastha, and S. Kapat, "Exact-Order Discrete-Time Modeling of a DAB Derived Hybrid Switched-Capacitor Converter", in proc. *IEEE APEC*, Houston, Texas, USA, March 2022.

[10] G. Reddy, D. Chatterjee, R. Mallik, and S. Kapat, "Discrete-Time Modeling Framework for Analysis of LLC Converters over a Wide Frequency Range", in proc. *IEEE APEC*, Houston, Texas, USA, March 2022.

[11] R. Roy, K. Hariharan, and S. Kapat, "Discrete-Time Trajectory based Control of DC-DC Converters and Applications to LED Driving", in proc. *IEEE APEC*, Houston, Texas, USA, March 2022.

[12] P. Majumder, S. Kapat, and D. Kastha, "Fast Transient State Feedback Digital Current Mode Control Design in Series Capacitor Buck Converters", in proc. *IEEE APEC*, Houston, Texas, USA, March 2022.

[13] P. Singh, K. Hariharan, and S. Kapat, "High-Frequency Digital Current Mode Control Architectures for Class-D Audio Amplifiers", in proc. *IEEE APEC*, Houston, Texas, USA, March 2022.

[14] H. Sahoo, S. Kapat, B. Singh, "Small-Signal Modelling and Analysis of Converter Interactivity in Low-Voltage DC Grid", in proc. IEEE ICCCA, India, December, 2021.

[15] S. Kapat , "Beyond Stability and Performance Limits in Digital Current Mode Control Using Event-Based Sampling," in proc. *IEEE APEC* , Phoenix, Arizona, USA, 2021.

[16] S. Kapat , "Fixed and Variable Frequency Digital Current Mode Control: Structural Stability and Performance Limits," in proc. *IEEE APEC* , Phoenix, Arizona, USA, 2021.

[17] S. Kapat , "Sampling Delay Effect on Stability in a Multi-Phase Buck Converter Using Digital Current Mode Control," in proc. *IEEE APEC* , Phoenix, Arizona, USA, 2021.

[18] S. Kapat , "Event-Triggered Ripple-Emulated Digital Hysteresis Current Control Architectures in DC-DC Converters," in proc. *IEEE APEC* , Phoenix, Arizona, USA, 2021.

[19] S. Kapat , "An Analytical Approach of Discrete-Time Modeling of Fixed and Variable Frequency Digital Modulation," in proc. *IEEE APEC* , Phoenix, Arizona, USA, 2021.

[20] S. Kapat , "Digital Average Current Control Technique for High Performance SIMO-Based Dimmable LED Driving," in proc. *IEEE APEC* , Phoenix, Arizona, USA, 2021.

[21] V. Inder Kumar and S. Kapat , "Digital Hysteretic Average Current Control for Fast Recovery in a Non-Inverting Buck-Boost Converter," in proc. *IEEE APEC* , Phoenix, Arizona, USA, 2021.

[22] K. Hariharan and S. Kapat , "Online Controller Tuning in Current Mode Adaptive Off-Time Digital Control: A Large-Signal Approach," in proc. *IEEE APEC* , Phoenix, Arizona, USA, 2021.

[23] Rabisankar Roy and S. Kapat , "Stabilizing DPWM Current Mode Cascaded DC-DC Converters in DC Nano-Grid Without Clock Sharing," in proc. *IEEE APEC* , Phoenix, Arizona, USA, 2021.

[24] V. Inder Kumar and S. Kapat , "A Digitally Current Mode Controlled Non-Inverting Buck-Boost Converter for Fast Voltage Transitions," in proc. *IEEE APEC* , Phoenix, Arizona, USA, 2021.

[25] S. Kapat, G. Chilukuri, and S. Jash, "Small-Signal Modeling of SIMO DC-DC Converters and Comparative Continuous/Discrete-Time Results," **(download)**, in Proc. *IEEE COMPEL*, Aalborg, Denmark, Nov. 2020.

[26] P. Majumder, K. Hariharan, S. Kapat, I. Biswas, and D. Kastha, "Digital Current Mode Control Tuning in GaN-based Multiphase Boost Converters for Ultra-fast Transient," **(download)**, in Proc. *IEEE IECON*, Lisbon, Portugal, Oct. 2019.

[27] K. Hariharan, S. Kapat , and S. Mukhopadhyay, "Constant on-Time Multi-Mode Digital Control with Superior Performance and Programmable Frequency," **(download)**, in Proc. *IEEE APEC* , Anaheim, California, USA, March 2019 (best presentation award).

[28] A. Acharya, I. Kumar, and S. Kapat , "Dynamic Bus Voltage Configuration in a Two-Stage Multi-Phase Buck Converter to Mitigate Transients," **(download)**, in Proc. *IEEE APEC* , Anaheim, California, USA, March 2019 (best presentation award).

[29] A. Pal and S. Kapat , "Accurate Discrete-Time Modeling of an Interleaved Current-Fed Dual Active Bridge DC-DC Converter," **(download)**, in Proc. *IEEE APEC* , Anaheim, California, USA, March 2019.

[30] A. Pal and S. Kapat , "Discrete-Time Modeling of a Naturally Commutated Current-Fed Dual Active Bridge DC-DC Converter," **(download)**, in Proc. *IEEE APEC* , Anaheim, California, USA, March 2019.

[31] S. Majhi, K. Hariharan, and S. Kapat , "Switching Sequence Synthesis for Minimizing RMS Current in a Single-Inductor-Multi-Output Converter," **(download)**, in Proc. *IEEE APEC* , Anaheim, California, USA, March 2019.

[32] S. Khatua, D. Kastha, and S. Kapat , "A Transformer-Less Quadruple-Active-Half-Bridge Converter for the Two-Stage 48V VRM Application," **(download)**, in Proc. *IEEE APEC* , Anaheim, California, USA, March 2019.

[33] S. Khatua, D. Kastha, and S. Kapat , "Novel Transformer-less DAB Converters for the Regulated First-Stage of a Two-Stage 48V VRM," **(download)**, in Proc., *IEEE ECCE* , Portland, USA September 2018.

[34] S. Khatua, D. Kastha, and S. Kapat , "A Non-Isolated Single-Stage 48V-to-1V VRM with a Light Load Efficiency Improvement Technique," **(download)**, in Proc., *IEEE ECCE* , Portland, USA September 2018.

[35] S. Khatua, D. Kastha, and S. Kapat , "A Novel ZVT Switched Capacitor Converter for the Input-Stage of a Cascaded Two-Stage 48V VRM," **(download)**, in Proc., *IEEE ECCE* , Portland, USA September 2018.

[36] R. Roy and S. Kapat, "Near Time Optimal Recovery in a Digitally Current Mode Controlled Buck Converter Driving a CPL," **(download)**, in Proc., *IEEE APEC* , San Antonio, Texas, USA, March 2018.

[37] I. Kumar, A. Dey, and S. Kapat, "Single-Inductor Multi-Capacitor Buck Converter for High Peak-to-Average Power Envelope Tracking, " **(download)**, in Proc., *IEEE APEC* , San Antonio, Texas, USA, March 2018.

[38] A. Pal, S. Kapat, K. Jha, and A. Tiwari, "Discrete-Time Framework for Digital Control Design in a High-Frequency Dual Active Bridge Converter, " **(download)**, in Proc., *IEEE APEC* , San Antonio, Texas, USA, March 2018.

[39] A. K. Singha, S. Kapat, and J. Pal, "A Robust Design Framework for Stable Digital Peak Current-Mode Control Under Uniform Sampling," **(download)**, in Proc. *IEEE ECCE*, Milwaukee, WI, USA, Sept. 2016.

[40] A. Mandal, I. Kumar, and S. Kapat, "Multi-Band Mixed-Signal Hysteresis Current Control for EMI Reduction in Switch-Mode Power Supplies," **(download)**, in Proc. *IEEE APEC*, Long Beach, CA, USA, March 2016.

[41] K. Hariharan, S. Kapat, and S. Mukhopadhyay, "Unified Constant on/Off-Time Hybrid Compensation for Fast Recovery in Digitally Current-Mode Controlled Point-of-Load Converters," **(download)**, in Proc. *IEEE APEC*, Long Beach, CA, USA, March 2016.

[42] I. Kumar and S. Kapat, "Mixed-Signal Hysteretic Internal Model Control of Buck Converters for Ultra-Fast Envelope Tracking," **(download)**, in Proc. *IEEE APEC*, Long Beach, CA, USA, March 2016.

[43] B. Mandi, S. Kapat, and A. Patra, "Fractional Pulse Skipping in Digitally Controlled DC-DC Converters for Improved Light-Load Efficiency and Power Spectrum," **(download)**, in Proc. *IEEE APEC*, Long Beach, CA, USA, March 2016.

[44] S. Kapat, "Beyond Time Optimal Performance Using SIMO DC-DC Converters in Dynamic Voltage Scaling," **(download)**, in Proc. *IEEE APEC*, Charlotte, NC, USA, March 2015.

[45] S. Kapat, "Reconfigurable Bi-Frequency DPWM with Custom Spectral Shaping in a Synchronous Buck Converter," **(download)**, in Proc. *IEEE APEC*, Charlotte, NC, USA, March 2015.

[46] S. Kapat, "Voltage-Mode Digital Pulse Train Control for Light Load DC-DC Converters with Spread Spectrum," **(download)**, in Proc. *IEEE APEC*, Charlotte, NC, USA, March 2015.

[47] S. Kapat, "Analysis and Synthesis of Reconfigurable Digital Pulse Train Control in a DCM Buck Converter," **(download)**, in Proc. *IEEE IECON*, Dallas, TX, USA, Oct./Nov., 2014.

[48] S. Kapat "Near Time Optimal PID Tuning in a Digitally Controlled Synchronous Buck Converter," **(download)**, in Proc. *IEEE COMPEL*, Santander, Spain, June 2014.

[49] S. Kapat and K. Hariharan, "Enhanced Large-signal Stability and Performance in Digital PID Control in a DC–DC Boost Converter," **(download)**, in Proc. *IEEE COMPEL*, Santander, Spain, June 2014.

[50] I. Kumar and S. Kapat, "Geometric Control Breaks Tracking Performance Limits Using Linear Control in a Buck Converter," , **(download)**, in Proc. *IEEE COMPEL*, Santander, Spain, June 2014.

[51] S. Kapat et al., "Embedded Reconfigurable Augmented DC-DC Boost Converter for Fast Transient Recovery," **(download)**, in Proc. *IEEE VLSI Design* , Pune, India, January 2013.

[52] T. J. Neyens, P. S. Shenoy, S. Kapat, and P. T. Krein, "Implementation of an augmented boost converter for improved load transient response," **(download)**, in Proc. *IEEE PECI*, Illinois USA, February 2012.

[53] P. Shenoy, P. Krein, and S. Kapat, "Beyond Time-Optimality: Energy-Based Control of Augmented Buck Converters for Near Ideal Load Transient Response," **(download)**, in Proc. *IEEE APEC*, Fort Worth, TX, USA, March 2011.

[54] O. Kumar, P. Shenoy, P. Krein, and S. Kapat, "Augmented Boost Converter for Near Null Load Transient Response," **(download)**, in Proc. *IEEE PECI*, Illinois USA, February 2011.

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