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Department of Electrical Engineering
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Hariharan Krishnaswami

Education

- 2005–2009 **Ph.D.**, *University of Minnesota*, Twin Cities, USA.
2000–2002 **M.Sc. (Engg.)**, *Indian Institute of Science*, Bangalore, India.
1995–1999 **B.E.**, *College of Engineering Guindy, Anna University*, Chennai, India.

Publications

1. H. Krishnaswami and N. Mohan, "Three-port series-resonant dc-dc converter to interface renewable energy sources with bi-directional load and energy storage ports," *IEEE Trans. Power Electron.*, vol. 24, no. 10, pp. 2289–2297, Oct. 2009.
2. H. Krishnaswami and N. Mohan, "Constant switching frequency series resonant three-port bi-directional dc-dc converter," in *Proc. IEEE Power Electronics Specialists Conference (PESC'08)*, 2008, pp. 1640–1645.
3. H. Krishnaswami and N. Mohan, "Simulation model of a three-port bi-directional series resonant dc-dc converter to determine component specifications," in *Proc. SCS Grand Challenges in Modeling and Simulation (GCMS'08)*, 2008.
4. H. Krishnaswami and N. Mohan, "A current-fed three-port bi-directional dc-dc converter," in *Proc. IEEE International Telecommunications Energy Conference (INTELEC'07)*, 2007, pp. 523–526.
5. R. K. Gupta, H. Krishnaswami, and N. Mohan, "A unified analysis of ccm boost pfc for various current control strategies," in *Proc. IEEE Power Electronics, Drives and Energy Systems (PEDES'06)*, 2006, pp. 1–5.
6. H. Krishnaswami and V. Ramanarayanan, "Control of high-frequency ac link electronic transformer," *IEE Proceedings in Electric Power Applications*, vol. 152, no. 3, pp. 509–516, May 2005.
7. H. Krishnaswami and V. Ramanarayanan, "Automatic voltage regulator (avr) using electronic transformer," in *Proc. NPEC National Power Electronics Conference (NPEC'03)*, IIT Bombay, India, 2003.
8. G. Shanmugavel and H. Krishnaswami, "Proximity detector and radiography system," U.S. Patent 6 985 556, Jan. 10, 2006.

9. H. Krishnaswami and V. Ramanarayanan, "An improved electronic transformer," India Patent 580/MAS/2002, Aug. 03, 2007.
10. H. Krishnaswami and N. Mohan, "Multi-port dc-dc converter," Energy, Economics and Environment Conference E3, Institute of Renewable Energy and Environment, University of Minnesota, 2007 and 2008, poster presentations.

Appointments

Sept '09 - present	Assistant Professor, Department of Electrical and Computer Engineering, The University of Texas at San Antonio
June '09 - Aug '09	Teaching Assistant with instructional duties, Department of Electrical and Computer Engineering, University of Minnesota
Sept '08 - May '09	Teaching Assistant, Department of Electrical and Computer Engineering, University of Minnesota
Sept '05 - Aug '08	Research Assistant, Department of Electrical and Computer Engineering, University of Minnesota
June '07 - Aug '07	Graduate Intern, Intel, Hillsboro, Oregon
Apr '02 - Aug '05	Design Engineer, GE Healthcare, Bangalore, India

Research Experience

Ph.D. Thesis	<i>Three-port DC-DC Converters to Interface Renewable Energy Sources with Bi-directional Load and Energy Storage Ports</i>
Adviser	Prof. Ned Mohan
Abstract	Multi-port converters are used in applications where multiple energy sources such as Fuel Cells, PV supply the load along with battery backup as in hybrid fuel cell automobiles and self sufficient residential buildings with PV array. In this thesis two converter topologies, series resonant and current-fed multi-port converters are proposed which have bi-directional power flow in all ports, softswitching capability and centralized control of power flow. A detailed analysis of the converter circuits to determine power flow, softswitching region and dynamic model is performed along with experimental verification.
M.Sc. Thesis	<i>High Frequency AC Link Electronic Transformer</i>
Adviser	Prof. V. Ramanarayanan
Abstract	An isolated high frequency link ac/ac converter is termed as electronic transformer. In this thesis a novel modulation scheme for control of high frequency ac link electronic transformer is presented which has reduced switching losses and filter requirement. An analysis of the switching transients in the converter, their nature with reference to losses and synthesis of lossless switching transitions to achieve efficient power conversion are presented. An automatic voltage regulator is constructed and evaluated using electronic transformer.

Teaching Experience

- 2008 - 2009 **Teaching Assistant**, *Department of Electrical Engineering*, University of Minnesota.
Instructor for Sophomore level Introduction to Electronic and Electrical Circuits Course in Summer 2009
Laboratory instructor for the Senior level Power Electronics Lab and Senior level Electric drives lab responsible for development of lab experiments, lab manuals and grading of lab reports. Also responsible for grading in Electric drives course
- Lab development Developed a PSpice based Power Electronics lab for undergraduate students containing a total of 25 experiments. This is presently being disseminated through the Center for Reforming Electric Energy Systems Curriculum, University of Minnesota
- Other Explained power electronics lab experiments to faculty members during the weeklong summer workshop conducted by University of Minnesota in July 2008

Honors

- Assistantship Research Assistant at the Department of Electrical Engineering, University of Minnesota from Fall 2005 - Summer 2008 responsible for design and evaluation of Multi-port DC-DC converter. This project was sponsored by Institute of Renewable Energy and Environment, University of Minnesota
- Travel grant Obtained Department of Electrical Engineering, University of Minnesota, travel grant to attend Power Electronics Specialists Conference at Rhodes, Greece
- Scholarship Scholarship from Ministry of Human Resources and Development, Government of India to support my Masters program at the Department of Electrical Engineering, Indian Institute of Science from January 2000 - March 2002

Professional Activities

- Member IEEE and Power Electronics Society (PELS) member since 2000
IEEE Power and Energy Society member since 2009
- Reviewer IEE Journal for Power Electronics
Applied Power Electronics Conference (APEC 2009)
National Power Electronics Conference, India (NPEC 2007)

Skills

- Software Matlab, Simulink, Saber, PCAD - PCB design, Hardware Description Language - Verilog, Modelsim, Cadence, PSpice, DSP programming