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Tutorial Title

Design of the Magnetic Components: Key Aspects, Approach, and Practice

Instructor Team

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Abstract

This tutorial is oriented on designing of high-frequency power magnetic components for power conversion. It is intended for graduate-level students that seeks the know-how and best practices to design high efficiency converters with efficient and reliable magnetic components. The tutorial is divided into three parts: Theory part, which includes: magnetic materials applications, winding types applications, and insulation coordination,
Design part, where medium-frequency and high-power transformer will be modeled and simulated. The simulation models, as well as design procedures, will be provided for participants use.
Verification part, where simulation results are verified with the design assumptions and requirements.

Instructor Team Biographies

Rafal P. Wojda (Senior Member, IEEE) received the B.S. and M.S. degrees in electronics engineering from the Institute of Radioelectronics and Multimedia Technology, Warsaw University of Technology, Warsaw, Poland, in 2007 and 2009, and the Ph.D. degree in electronics, microwave, VLSI, and nanotechnology from the Department of Electrical Engineering, Wright State University (WSU), Dayton, OH, USA, in 2012. During 2009–2010, he was a Fulbright Scholar at WSU. Since 2012, he has been a Senior Scientist with ABB Corporate Research Center in Poland, where he has been focusing on magnetic components optimization for renewable, EV, power protection, and rail. Since 2018 he has been a Research Staff at Oak Ridge National Laboratory, where he focuses on advanced power flow magnetic components for low and medium voltage high frequency applications.

Vandana Rallabandi (Senior Member, IEEE) received the master's and Ph.D. degrees from the Indian Institute of Technology Bombay, Mumbai, India. She was a Lead Engineer with GE Research, Niskayuna, NY, USA. She was a Postdoctoral Researcher with the SPARK Lab, University of Kentucky, Lexington, KY, USA, and a Research Engineer with the GE Research Center, Bangalore, India. Since 2022, she is with the Oak Ridge National Laboratory. She has authored more than 40 journal and conference proceedings papers, including three that received awards from IEEE, IET, and ICRERA, respectively, coauthored four book chapters. Her research interests include electric machines, power electronics drives, renewable energy devices and systems, energy storage, and power systems.

Marcio L. M. Kimpara (Member, IEEE) was born in Jales, Brazil, in May 1986. He received the B.S. and M.S. degrees in electrical engineering from the Federal University of Mato Grosso do Sul (UFMS), Campo Grande, Brazil, in 2009 and 2012, respectively, and the Ph.D. degree from the Federal University of Itajubá, Itajubá, Brazil, in 2018. He was a Professor with the Department of Electric Engineering, UFMS. Since 2022 he is with Oak Ridge National Laboratory. His research interests include power electronics, renewable energy, and electric machines and drives.