

Lecture

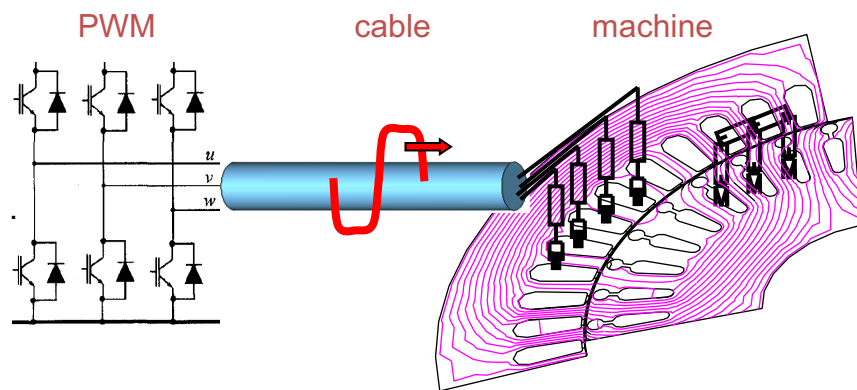
Simulating wave propagation effects in machine windings by transmission-line models

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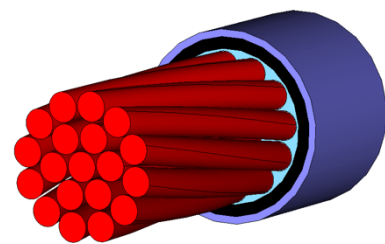
11th April 2019, 14:30 h

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The lecture deals with transmission-line models for simulating wave propagation effects in machine windings, which occur due to their excitation by power-electronics converters



switching at elevated frequencies. After recapitulating the standard transmission-line model, the model is reformulated for the multi-conductor case and the procedure for determining the model parameters by finite-element calculation is pointed out. The transmission-line model is then reconverted in order to accommodate the winding scheme and in order to consider the cross-talk due to the capacitive coupling along the yoke. The propagating modes are investigated and the input impedance as a function of frequency is plotted. Further issues such as the influence of nonlinearity, the occurrence of common-mode effects and the relating to bearing currents are indicated.



Prof. Dr.-Ing. Herbert De Gersem received the MSc and PhD degrees in electrical engineering from the KU Leuven, Belgium, in 1994 and 2001. From 2001 to 2006 he was at the Technische Universität Darmstadt in Germany. Since 2001 he is an associated professor at the KU Leuven. Since 2014 he is full professor and head of the Institut für Teilchenbeschleunigung und Elektromagnetische Felder (TEMF) at the Technische Universität Darmstadt. His research interests are finite-element electromagnetic field simulation for electrotechnical devices and particle accelerators and FDTD and FETD techniques for electromagnetic and ultrasonic wave propagation.