BOMBARDIER

KTH VETENSKAP OCH KONST

Master's Thesis:

Modelling of rolling stock auxiliary transformers and inductors

Background

To save development time Bombardier Transportation is striving for applying Model Based Design, but so far we lack a three phase transformer model that can reproduce the true couplings between phases.

Objective

The main objective of the master's thesis is to develop an advanced three phase transformer circuit model in MATLAB - Simulink/Plecs for use in Model Based Design of auxiliary converters.

The project will consist in the following tasks:

1. Develop circuit models of both a three phase transformer and a three phase inductor in Matlab-Simulink/Plecs, including phenomena like common mode and differential mode inductance and preferably also core saturation, hysteresis and frequency dependent winding losses.
2. Tune the model using real data from our transformer supplier, perhaps also from your own measurements in our Power Lab.
3. Using this model to study various topics of our railway rolling stock auxiliary converters, e. g. results of unsymmetrical load, resonances on three phase buses fed from multiple converters and loss optimization.

If the student shows good interest towards research publication there is possibility to publish limited information.

Application

Prerequisites: Electrical Engineering, Electric Power Engineering or Engineering Physics program including courses in electromagnetics and Matlab modelling. Additional Matlab programming experience or courses in power electronics is a plus.

For more information, contact

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