Contribution ID: **280** Type: **Poster Presentation**

Novel GSSA Modeling of Switching Functions and Control of High Power Voltage Source Inverters (VSI) for Advanced Aircraft Electric Power Systems

Thursday, 7 July 2016 14:40 (20 minutes)

The growing complexity and nonlinear structure of modern aircraft electric power systems with extensive nonlinear loading made available state-space averaging models inadequate for accurate analysis and characterization of such systems. In this paper, the Generalized State-Space Averaging (GSSA) model is applied for the analysis, control, and characterization of SPWM twelve pulse inverter in advanced aircraft electric power systems. The proposed GSSA model has been applied to derive the corresponding averaged model of the reduced-order system for the voltage source inverter, while taking into consideration the interaction with the entire aircraft electric power system. An accurate model of the switching function approximations has been derived by developing average duty cycle intervals over several regions of the PWM switching pulses. The first order approximations of the modulated signals are subsequently generated and the inverter's input and output profiles have been captured according to the GSSA model. Moreover, the proposed approximated model can be employed to generate real-time control signals using available hardware. Furthermore, the developed model and the results obtained are presented and discussed.

Primary author: Mr EBRAHIMI, Hadi (The University of Texas at Tyler)

Co-author: Mr EL-KISHKY, Hassan (The University of Texas at Tyler)

Presenter: Mr EBRAHIMI, Hadi (The University of Texas at Tyler)

Session Classification: Poster 2-B

Track Classification: Opening, Closing, and Solid State Switches