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SANDIA'S AUTOMATED TRANSFER FUNCTION GENERATOR

TECHNOLOGY DESCRIPTION

U.S. Patent#9,009,640

Technology Readiness Level: 3/4

Basic technological Components are integrated to establish that the pieces will work together

When designing or analyzing electrical systems, it is important to understand the relationship between input and output. Power conversion occurs in a “black box” and transfer functions can be used to provide a better understanding of the processes occurring in this “black box”. Although they provide a useful analysis tool, transfer functions are not often utilized because they require complicated, time-consuming derivation that ignores nonlinear behavior common in real world systems.

The Automated Transfer Function Generator software was developed by Sandia to provide a solution to tedious, manual transfer function derivation and improve the design and analysis of electrical systems. This software generates transfer functions utilizing multiple reference frame theory, which enables some nonlinear properties to be modeled using linear transfer functions. Other transfer function analysis software works by perturbing the input of the system, ignoring any nonlinear behavior, and then finding the function that explains the system’s linear response. Sandia’s Automated Transfer Function Generator determines the mathematical transfer functions rather than using a system response approach, allowing users to redesign systems until they get the desired response.

TECHNOLOGICAL BENEFITS

- Useful design & analysis tool
- Quick, easy, & accurate derivation of transfer functions

POTENTIAL APPLICATIONS

- Grid power electronics
- Motor drives
- Aerospace electrical systems
- Renewable & distributed energy resources
- Defense
- Power conversion systems
- Grid-tied energy storage
- Electric vehicles

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