

Modeling, Control and Stability Analysis of a PEBB Based DC Distribution Power System

by

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(ABSTRACT)

Power Electronic Building Block (PEBB) concept is to provide generic building blocks for power conversion, regulation and distribution with control intelligence and autonomy. A comprehensive modeling and analysis of a PEBB based DC distributed power system (DPS), comprising of a front end power factor correction (PFC) boost rectifier, a DC-DC converter and a three phase four leg inverter is performed. All the sub-systems of the DC DPS are modeled and analyzed for stability and good transient performance.

A comprehensive stability analysis of a PEBB based DC DPS is performed. The effect of impedance overlap on the system and individual sub-systems is examined. Ability of a PEBB based converter to stabilize the integrated system by actively changing the system bandwidth is presented. The fault tolerance capability in a PEBB based rectifier is established by ensuring stable system operation, with one leg of the rectifier failed open-circuited.

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