

Design of Control Systems for Grid Interconnection and Power Control of a Grid Tie Inverter for Micro-Grid Application

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Abstract : COEP-Microgrid, a project by the students of College of Engineering Pune aims at establishing a micro grid in the college campus serving as a living laboratory for research and development of novel grid technologies. Proposed micro grid has an AC-bus and DC-bus, interconnected together with a tie line DC-AC converter. In grid-connected mode AC bus of microgrid is synchronized with utility grid. Synchronization with utility grid requires grid and AC bus to have synchronism in frequency, phase sequence and voltage. Power flow requires phase difference between grid and AC bus. Control System is required to effectively regulate power flow between the grid and AC bus. The grid synchronizing control system is composed of frequency and phase control for regulated power flow and voltage control system for reduction of reactive power flow. The control system involves automatic active power flow control. It takes the feedback of DC link Capacitor and changes the power angle accordingly. Control system incorporating voltage, phase and power control was developed for grid-tie inverter. This paper discusses the design, simulation and practical implementation of control system described in various micro grid scenarios.

Keywords : microgrid, Grid-tie inverter, voltage control, automatic power control

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