ABSTRACT

In an AC or DC distribution system, where multiple power sources supply a common bus, current sharing is an important issue. When renewable energy resources are considered, such as photovoltaic (PV), wind, dc/dc converters are needed to decouple the source voltage, which can vary due to operating conditions. Since different sources may have different power delivery capacities that may vary with time, coordination of the interface to the bus is of paramount importance to ensure reliable system operation. Further, since these sources are most likely distributed throughout the system, distributed controls are needed to ensure a robust and fault tolerant control system. Model predictive control-based droop current regulator to interface PV and Wind in smart AC or DC distribution systems. Bidirectional VSC converters are used to interface the renewable energy sources with the Grid and all the control schemes are implemented in it (including the current, voltage and power sharing controls). Among them, power-angle control and VCC (vector-current control) are the two that have been mostly investigated. By the mean of phase angle, active power is controlled in the VSC and by controlling the voltage magnitude, reactive power is controlled. In proposed work, a control scheme (frequency droop control) is implemented on VSCs in order to control the frequency under different loading conditions. PWM based VSC are widely used in Grid connected VSC. To overcome the problems of voltage and frequency instability, a proper model of a microgrid is implemented on PSCAD having renewable energy source in it and synchronization of the source with the Grid is ensured. The power sharing control between the energy sources and Grid is implemented in PSCAD to ensure the synchronization. The control schemes on the three types of AC network are implemented. In Stiff Grid, droop based frequency control is implemented in PSCAD. In weak Grid and passive network, AC voltage control is implemented in PSCAD and DC overvoltage control is also implemented in the model in PSCAD. All these control schemes are implemented in PSCAD in order to operate the system smoothly under different loading conditions and within the acceptable range of error.