

Transient and Steady-State Characteristics of DC Machines Fed By Solar Cells

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Abstract

This paper presents dynamical model and analysis of DC shunt and series motors fed by photovoltaic PV energy systems. The maximum power point of current/voltage I/V characteristics of the PV modules is chosen to be at the rated conditions of the machines. The nonlinear behavior of I/V characteristics of the PV modules and that of the magnetization curve of the ferromagnetic materials of the DC machines are approximated by polynomial curve fitting. The dynamical analysis of the two machines fed by fixed terminal voltage has also been carried out. A comparison between the two cases is outlined. The steady-state output characteristics, the torque-speed characteristics, of the two DC motors with the two inputs are presented and compared. All of the simulations are executed using MATLAB environment.