

Fuzzy-PSO controller design for maximum power point tracking in photovoltaic system

Youcef Soufi, Mohcene Bechouat, Sami KAHLA

Abstract: Photovoltaic power generation system becomes increasingly important, highly attractive as a clean and renewable energy sources, widely used today in many applications. Recently, researchers have strongly promoted the use of solar energy as a viable source of energy due to its advantages and which it can be integrated into local and regional power supplies. The P–V curve of photovoltaic system exhibits multiple peaks under various conditions of functioning and changes in meteorological conditions which reduces the effectiveness of conventional maximum power point tracking (MPPT) methods and the Particle swarm optimization (PSO) algorithm is considered to be highly efficient for the solution of complicated problems. In this paper, the application of this approach based MPPT algorithm for Photovoltaic power generation system operating under variable conditions is proposed to optimize and to design an intelligent controller comparing to conventional one. PSO Approaches is considered to select and generate an optimal duty cycle which varies with photovoltaic parameters in order to extract the maximum Power. Simulation results show that the proposed approach can track the maximum power point faster and can improve the performance of the system compared to the conventional method.

Keywords : Particle Swarm Optimization (PSO), photovoltaic System, Boost, PWM, MPPT, FLC