Abstract

One way to improve the efficiency of solar powered systems is to maximize the energy harvesting from the photovoltaic module by using a maximum power point tracking algorithm. The latter must be simple for implementation, fast and accurate to cope with fast changing atmospheric conditions and partial shading operations. The paper presents a new maximum power point tracking method based on Golden-Section Optimization technique for photovoltaic systems. The proposed method converges to the Maximum Power Point by interval shrinking. Initially, two points are selected from the search space whose boundaries are known, evaluated then a new point is accordingly generated. At given iteration the algorithm has a new narrowed interval bounded by the new point and one of the initial points according to the evaluation results. The algorithm stops iterating (interval shrinking) when the interval becomes small enough and the photovoltaic system is forced to operate at the average value of the last found interval without perturbing either the voltage or the duty cycle. This makes the photovoltaic system converges rapidly to the maximum power point without voltage or power oscillations around the maximum power point thereby lower energy waste. A comparison results with recently published work are provided to show the validity of the proposed algorithm under fast changing conditions and partial shading