

Modified 'Perturb and Observe' with 'Incremental Conductance' Algorithm for Maximum Power Point Tracking

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Abstract : The trend of renewable energy resources has been amplified due to global warming and other environmental related complications in the 21st century. Recent research has very much emphasized on the generation of electrical power through renewable resources like solar, wind, hydro, geothermal, etc. The use of the photovoltaic cell has become very public as it is very useful for the domestic and commercial purpose overall the world. Although a single cell gives the low voltage output but connecting a number of cells in a series formed a complete module of the photovoltaic cells, it is becoming a financial investment as the use of it fetching popular. This also reduced the prices of the photovoltaic cell which gives the customers a confident of using this source for their electrical use. Photovoltaic cell gives the MPPT at single specific point of operation at a given temperature and level of solar intensity received at a given surface whereas the focal point changes over a large range depending upon the manufacturing factor, temperature conditions, intensity for insolation, instantaneous conditions for shading and aging factor for the photovoltaic cells. Two improved algorithms have been proposed in this article for the MPPT. The widely used algorithms are the 'Incremental Conductance' and 'Perturb and Observe' algorithms. To extract the maximum power from the source to the load, the duty cycle of the convertor will be effectively controlled. After assessing the previous techniques, this paper presents the improved and reformed idea of harvesting maximum power point from the photovoltaic cells. A thoroughly go through of the previous ideas has been observed before constructing the improvement in the traditional technique of MPP. Each technique has its own importance and boundaries at various weather conditions. An improved technique of implementing the use of both 'Perturb and Observe' and 'Incremental Conductance' is introduced.

Keywords : duty cycle, MPPT (Maximum Power Point Tracking), perturb and observe (P&O), photovoltaic module

Conference Title : ICREC 2017 : International Conference on Renewable Energy and Conversation

Conference Location : Istanbul, Türkiye

Conference Dates : December 21-22, 2017