MPPT Controller For Grid Tied PV System Based On Improved Sepic Converter

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Abstract:
Solar Photovoltaic (PV) systems are becoming more and more popular because they convert solar radiation directly into clean, renewable electricity. Partial shading situations are when a PV module may be partially shadowed, which might result in a reduction in the solar panel's power production. It significantly lowers the system's power output. To address this, continuous duty cycle variation methods that track MPP under partial shade have been proposed. An innovative Type-2 Fuzzy Maximum Power Point Tracking (MPPT) algorithm that can monitor a Supreme Power Point in the presence of numerous local maxima has been incorporated into the proposed system. In these schemes, the proposed Improved Single Ended Primary Inductance Converter (SEPIC) is coupled to PV module to enable the maximum output voltage under any given circumstance. This makes the device more compact. The converter's objective is to deliver input currents with an acceptable harmonic content in a grid interface while maintaining a constant power supply. Finally, several numerical simulated testing of the proposed control utilizing the MATLAB is carried out.

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Contents

Large-scale photovoltaic systems are increasingly a practical way to increase the amount of renewable energy entering the grid [1]. Future power systems will incorporate a large amount of solar PV and wind power systems due to environmental concerns and the transition to a sustainable society. The current tendency is to phase out coal and fossil fuels while stepping up renewable energy sources. Given that sunlight is one of the most plentiful and readily available energy sources on our planet, PV systems have a substantial advantage over other renewable energy sources in this regard [2]. Power electronics converter interfaced sources in the grid expand as a result of an increase in renewable output from solar and wind farms. The majority of renewable energy sources are currently interfaced through grid feeding converters, or converters that enforce active power injection while being regulated as current sources [3].