

# Fuzzy control for capacitor voltage balancing in a three-level boost converter using PV applications

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## Abstract

In this paper, MPPT control in PV systems is used by the FPI method which is an intelligent method. Further, the use of a TLBC as an interface converter instead of a conventional boost converter is examined in the PV system and a new transfer function of TLBC in terms of the mode of switching is verified. The main purpose of this paper is to balance voltage capacitors of TLBC by an intelligent fuzzy method. The rules of this controller are adjusted such that, in case of any disturbance in daylight and solar radiation, it can adjust the duty cycle TLBC, where voltage capacitors become well-adapted by being combined with MPPT controller. The simulation results verify the good performance of the proposed controller. Uncertainty parameters include the surrounding temperature, solar radiation, and output electric charge. The first two cannot be controlled by humans and may suddenly change by atmospheric conditions, while the third may suddenly change by the user and can be controlled by the proposed controller under any conditions. A dramatic change in the resistance electric charge is considered in this paper, where the voltage of capacitors does not have any overshoot or fluctuation. The simulation results verify that the capacitor voltage balance in the region is acceptable.

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