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**Abstract:** Sliding mode controllers for power converters usually employ hysteresis comparators to directly generate the power semiconductors switching states. This paper presents a new sliding mode modulator based on the direct implementation of the sliding mode stability condition, which for multilevel power converters shows advantages, as branch equalized switching frequencies and less distortion on the ac currents when operating near the rated converter power.

The new sliding mode multilevel modulator is used to control a three-phase multilevel converter, operated as a reactive power compensator (STATCOM), implementing the stability condition in a digital signal processing system. The performance of this new sliding mode modulator is compared with a multilevel modulator based on hysteresis comparators. Simulation and experimental results are presented in order to highlight the system operation and control robustness.

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