

Author(s): Encarnação, L (Encarnação, Luis); Silva, JF (Silva, J. Fernando)

Book Group Author(s): IEEE

Title: Stability Condition Based Sliding Mode Modulators for Multilevel Power Converters

Source: IECON: 2009 35th Annual Conference of IEEE Industrial Electronics, VOLS 1-6: 813-818 2009

Language: English

Document Type: Proceedings Paper

Conference Title: 35th Annual Conference of the IEEE-Industrial-Electronics-Society (IECON 2009)

Conference Date: NOV 03-05, 2009

Conference Location: Porto, PORTUGAL

Conference Sponsors: IEEE Ind Elect Soc.

Author Keywords: Sliding-mode control; Sliding mode modulator; Power quality enhancement; Reactive power

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.

Addresses: [Encarnação, Luis] Cie3, Inst Super Engn Lisboa, Lisbon, Portugal

Reprint Address: Encarnação, L, Cie3, Inst Super Engn Lisboa, Lisbon, Portugal.

Publisher: IEEE

Publisher Address: 345 E 47TH ST, NEW YORK, NY 10017 USA

ISBN: 978-1-4244-4648-3

ISI Document Delivery No.: BQE04