

# **A NOVEL DIRECT POWER CONTROL METHOD OF MATRIX CONVERTER AS UPFC**

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## **ABSTRACT**

This paper presents state space vector analysis for three-phase matrix converter (MC) operating as unified power flow controllers (UPFCs). It allows direct ac/ac power conversion without dc energy storage links; therefore, it reduces volume, cost, and capacitor power losses, together with higher reliability. The line active and reactive power, together with ac supply reactive power, can be directly controlled by selecting an appropriate matrix converter switching state guaranteeing good steady-state and dynamic responses. This advanced control of MC guarantee faster responses without overshoot and no steady- state error, presenting no cross-coupling in dynamic and steady-state responses. Simulations are carried out, showing the effectiveness of the proposed method in steady-state and transient conditions.

**KEYWORDS:** Direct Power Control (DPC), Matrix Converter (MC), Unified Power Flow Controller (UPFC), State Space Vectors