



# Adaptive Voltage Control Based Three Phase Inverter for Standalone Distributed Generation System

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**Abstract:** A robust adaptive voltage control of three-phase VSI is proposed for a distributed generation system in an unconnected operation. For load-side inverter which considers only the uncertainties of system parameters, the state-space model is established first. The adaptive voltage control technique combines an adaption control term and a state feedback control term. The adaption control part compensates for system uncertainties, whereas the state feedback control part forces the error dynamics to converge exponentially to zero. This algorithm is easy to implement and performances like fast transient response, zero steady-state error, and low THD is guaranteed. The robustness of the closed-loop control system can be found by stability analysis. The performance comparison between adaptive and non adaptive voltage controller under parameter uncertainties is presented using simulation and experimental result to validate the proposed control scheme effectiveness.

**Index terms:** Adaptive voltage control, distributed generation system (DGS), robust control, stability analysis, standalone operation, uncertainties, voltage source inverter