

Finite-Control Set Model-Predictive Control for Single-Phase Voltage-Source UPS Inverters

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Abstract—Uninterruptable power supply (UPS) applications require a well regulated sinusoidal output voltage with low total harmonic distortion (THD). These requirements are achieved by model predictive control (MPC) of UPS inverter with LC filter on the output. The controller uses the model of the system to predict the future behavior of the controlled variables for all possible voltage vectors, and uses the information to obtain optimal action by choosing the voltage vector

which minimizes a cost function. A Matlab/Simulink model is used to obtain simulation results to show that the performance of the proposed control system can achieve a sinusoidal load voltage with low THD.

Index Terms-- uninterruptable power supply, inverter with LC filter, predictive control, discrete time model.