

Synergistic Approaches for Mitigation of Harmonic Distortion in Power Systems: A Review

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Abstract

This abstract delves into diverse mitigation strategies aimed at alleviating harmonic distortion within power systems. Harmonic distortion poses significant challenges to power infrastructure, leading to equipment overheating, augmented losses, and interference with communication systems. To counteract these adversities, a number of mitigation methods have been developed, encompassing passive and active filters, harmonic isolation transformers, phase-shifting transformers, active front-end converters, pulse width modulation techniques, switching frequency optimization, resonant converters, hybrid solutions, and load management and distribution strategies. Each technique offers distinct advantages and constraints, with the selection contingent upon considerations such as harmonic frequency and magnitude, cost-effectiveness, and specific system requisites. Through the integration of a synergistic array of mitigation measures, power systems can effectively mitigate harmonic distortion, thereby ensuring sustained operational efficiency and reliability.

Keywords

Passive filtering techniques, Active filtering techniques, Harmonic isolation transformers, Pulse Width Modulation techniques, Hybrid mitigation strategies.

