Digital symmetrical analysis of AC/DC interactions and harmonic mitigations for multi-pulse converter systems

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Abstract:

This article develops a digital mathematical model in symmetrical components to handle multi-pulse converters power system equipped with correction power factor capacitors or shunt passive harmonic filters. The model simulates AC/DC interaction system in both AC and DC sides with balanced and unbalanced AC system voltages and is adapted for general representation of converter transformers to meet Y/Δ, Y/Y, and Y/Z connections. Comparison results with previous works are given with correction power factor capacitors or shunt passive harmonic filters. The results also included the interaction of AC/DC systems resonating with shunt capacitors at one or more of harmonic power-frequency and the resulting zero sequence harmonics due to AC unbalanced voltage.

Keywords:

symmetrical components, multi-pulse converters, harmonic analysis, phase shift transformers, unbalanced AC voltage, interaction of AC/DC systems

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