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A NOVEL APPROACH IN THE DESIGN OF OPTIMAL TUNING FREQUENCY OF A SINGLE TUNED HARMONIC FILTER FOR AN ALTERNATOR WITH RECTIFIER LOADS

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Abstract

Indian electrical industries supply alternators for rectifier loads, arc furnace loads and thyristor load applications to various customers. In such cases the generator line currents are not sinusoidal but are like trapezoidal which are due to harmonics .They may cause problems for utilities and industrial power system. Single tuned (ST) filter is the most commonly used device for both harmonic suppression and reactive power compensation The objective of this paper is to obtain the optimal tuning frequency of a single tuned harmonic filter in order to control harmonic current to the allowable value with a minimum filter capacity or a given capacity by scanning the partial resonance ratio and filter resistance within possible range. Computer aided design procedure for ST filters and an associated simulation code for analysis of industrial power system with harmonic filters are illustrated. The reverse order design for multiple filter branches and usage of C#.net software for achieving optimal frequency are added features of this paper.

Keywords : Filter design; harmonic analysis; single-tuned filter; partial resonant ratio; detuning; optimal tuning frequency.