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TUTORIAL

Tutorial Title

Interharmonics: What are the Causes, How to Measure Them and Why Do We Care?

Abstract

Interharmonics are spectral components at frequencies that are not integer multiples of the system fundamental frequency. They do occur in power ac system physiologically due to desynchronization of processes with power system frequency, or even intentionally by means of mains signaling.

Besides the typical problems caused by harmonics such as overheating and faster aging, interharmonics create some other problems like excitation of dormant resonances, sub- synchronous oscillations, power transformer saturation, induction motors loss of useful lifetime, light flicker, and interference with PLL based control systems even for very low- amplitude levels (0.1-0.5 %).

Emission of interharmonics can be observed in increasing number of loads. These loads include static frequency converters, cycloconverters, adjustable speed drives for induction or synchronous motors, arc furnaces, induction furnaces, and all loads not pulsating synchronously with the fundamental power system frequency. Moreover, inverter-based generation resources such as photo-voltaic and wind power plants as well as HVDC links are also a source of interharmonics and their penetration in power systems is rapidly increasing.

Besides interharmonics have been deeply studied during the last forty years, proper measuring metrics and fair limits to be adopted are still under discussion.

The tutorial is divided in three parts:

Part I) What Are Interharmonics and Why Do They Occur.

Part II) What Is the Effect of Interharmonics in Power Grids.

Part III) Measurement of Interharmonics, Compatibility Limits.

Speakers

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