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Fuzzy Logic Application of Steady-state Harmonic Distortion Limits for the Time-varying Harmonics

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1. Brief introduction

Harmonic distortion limits recommended by most international standards are designed for the steady-state harmonics, which are typically calculated for planning purpose. A problem can occur, however, when the limits are applied to actual time-varying harmonics. This paper proposes a new fuzzy logic application to apply modified steady-state harmonic limits using total demand distortion, which is recommended in the IEEE standard 159-1992, to the actual measured harmonic distortions which varies with time. Fuzzy logic application can provide simple and easy implementation and reflect experts' knowledge. The result of fuzzy logic application indicates how close is the current waveform to a pure sinusoidal wave shape and also reveals whether this distortion is within or outside the allowable limits. It is expected that this application can contribute for future developments of harmonics monitoring, evaluation, and mitigation strategies in the actual operating status of power system.

Key words

Fuzzy inference system (FIS), fuzzy logic, harmonics, power quality (PQ), time-varying signals

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