

A fast and efficient random flicker detection system based on a novel low-pass quadrature filter

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Many known literature techniques are available to detect flicker in electric power systems and to mitigate them. However, they are not suitable to detect random flicker in the presence of the higher-order harmonics. This is mainly due to their slowness in the flicker detection process, and thus, significant detection inaccuracies result. Therefore, a new low-pass quadrature-filter based fast and efficient technique is proposed here for detecting flicker, especially, random flicker under higher-order harmonics. By setting a proper low-pass cutoff frequency, the new technique can filter higher-order harmonics efficiently without any additional filters. It can quickly detect the random flicker amplitudes using shorter filter lengths with a detection error of less than 2%. This performance is confirmed using simulated flicker for different amplitudes and frequencies. In the new technique, the orthogonal-phase of the discrete-time flicker is calculated by convolving a new impulse response function with a novel low-pass quadrature filter response to suppress the higher-order harmonics and to detect the flicker.

Keywords: voltage-flicker, quadrature-filter, detection error and harmonics

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