

Load Estimation of Single-Phase Diode Bridge Rectifier using Kalman Filter

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Abstract:

These days most electronic loads are nonlinear. Electronic equipment such as audio devices, personal computers and electronic ballasts for discharge lamps are the example of nonlinear loads. These electronic loads are works in DC voltage. As the energy distribution system is performed in AC voltage, the AC voltage need to change into DC voltage. The single-phase rectifier performed the conversion of AC voltage to DC voltage in low power applications. The main drawback of these rectifiers is that they generate significant harmonic distortion. Components aging, power system efficiency lessen and excessive heat of equipments are the effects of harmonics in power system. Thus, the self-resonance, non-dielectric and hysteresis existed in the power system affected system designer to choose the passive components for the simulation. This paper portrays the study and development of an estimation method for the values of the electrical parts in the majority of the electronic equipment accessible in the market. It is conceivable to identify the values of equivalent capacitance, resistance and inductance that associated with the rectifier through this method. Simulation results validate the better accuracy of the proposed method when contrasted to the measurement-based method. The proposed method using Kalman filter to this rectifier topology enabled the expansion for future works to think about their harmonic effect on the power quality (PQ) of power distribution systems.

Keywords : Kalman Filter; parameter estimation; single-phase rectifier.

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