



University of Zabol

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Department of Electrical Engineering

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Agronomy Science)

A Modified Structure for Hybrid Power Filter with Optimizing Parameters Using the Meta-heuristic Algorithm

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Abstract

Nowadays, the power quality in a country can be considered a good index of industrial dynamism. Increasing the number of nonlinear loads creates voltage and current harmonics and decreases the power factor in power systems. Decreasing the power factor leads to increased losses. As well as, harmonics cause problems such as saturation of the iron cores of transformers and machines, improper operation of protection relays, increased losses and reduced power quality. Therefore, it is essential that power quality satisfies national and international standards such as IEEE-519. The power factor of a system is related to the cost in such a way that, consumers whose power factor are lower than the standard are fined. Also, in high-consumption systems, low power factor increases the current in the conductors, so the cross-section and cost of it increases. This extra current also reduces the life of the power supply and distribution equipment.

In this thesis, a hybrid power filter is proposed with three objectives function includes: reducing THD, costs and increasing power factor. The proposed filter consists of passive and active filter, the active filter of which consists of three parts: identification, modulation and inverter. To reduce the power level of the active filter inverter, a passive filter is used together it. The parameters of them are set by a meta-heuristic algorithm. Finally, the performance of the proposed hybrid filter is shown in MATLAB software.

Keywords: Passive Power Filter, Active Power Filter, Hybrid Power Filter, Multi Objective Optimization, Harmonics Compensation