Identification and modelling of a three phase arc furnace for voltage disturbance simulation

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Abstract-

This paper presents a new arc furnace model which copes with the two main voltage disturbances normally associated with arc furnaces: voltage fluctuations; and harmonics. The model is based on the stochastic nature of the electric arc current-voltage characteristic. The model has been estimated from measurements made in two actual electric plants. Although a single-phase model has been normally proposed, this paper develops a three-phase model in order to fully represent the unbalances that are present in real industrial plants and which play a central role in the behavior of compensation devices such as SVCs. The model has been implemented using the SIMULINK environment in order to facilitate later simulation of advanced disturbance control systems. Finally, the simulation results are compared with actual data in order to validate the accuracy of the model.

Index Terms-

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