

MODELLING OF ELECTRIC ARC FURNACE AND CONTROL ALGORITHMS USING DSTATCOM WITH FUZZY LOGIC FOR IMPROVEMENT OF POWER QUALITY

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ABSTRACT

Arc furnace represents one of the most intensive and disturbing loads in the electric power system concerned about. Electric arc furnace can go from zero to full load many times an hour as arc struck and broke in the furnace. Voltage flicker, a phenomenon of annoying light intensity fluctuation is a major concern for both power companies and customers. These fluctuation contribute to the voltage variation in the electrical distribution system causing flicker. Therefore, an accurate model of an arc furnace is needed to test and verify proposed solutions to this end. This paper, presents the results of a study, where furnace arc is modelled using both chaotic and deterministic elements. Voltage fluctuations (Sag), is captured using the well-studied circuit whereas a dynamic model in the form of differential equation is used for the electric arc. Simulation model is analyzed using Fuzzy Logic.

KEYWORDS: Electrical Arc Furnace (EAF), Flicker Mitigation, Power Quality, Reactive Power, DSTATCOM, p-q Theory, d-q Theory