



POWER SYSTEM STABILIZATION CONTROL USING FUZZY LOGIC

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Abstract

A reliable and continuous supply of electric energy is essential for the functioning of today's complex societies. Due to a combination of increasing energy consumption and impediments of various kinds concerning the extension of electric transmission networks, utilities are forced to operate the systems closer and closer to system stability limits. This in turn requires use of special control aids to improve damping of low frequency electromechanical oscillations.

The small signal stability problem is associated with modes of oscillations affecting a single machine or a small group of relatively closely connected machines. This problem has got a very high attention during the last three decades and many power system stabilizers based on classical and modern control theories have been developed to improve system damping.

In the recent years, fuzzy logic has emerged as a powerful tool and is starting to be used in various power system applications. The application of fuzzy logic control technique appears to be the most suitable one whenever a well- , defined control objective cannot be specified, the system to be controlled is a complex one, or its exact mathematical model is not available. The control strategy depends upon a set of rules which describes the behaviour of the controller.

In this thesis, a fuzzy-logic-based power system stabilizer to maintain stability and enhance closed-loop performance of a power system is developed. Simulation studies on a single machine infinite bus power system show that the proposed controller proves its effectiveness and improves the system damping compared to a conventional lead-lag power system stabilizer and an optimal power system stabilizer.

DECLARATION

I hereby declare that this submission is my own work and that, to the best of my knowledge and behalf, it contains no material previously published or written by another person nor material, which to substantial extent, has been accepted for the award of any other academic qualification of an university or institute of higher learning except where acknowledgement is made in the text.



D.K.P.U. Gunathilake
January, 2004

UOM Verified Signature

Dr. Nalin Wickramarachchi
Thesis Advisor
January, 2004

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