Abstract

As Power systems become more interconnected, analysis of dynamic performance of such systems become very important. Due to its increasing complexity, the stabilization of system is recent interest of area. Power system mostly subjected to low frequency oscillations due to disturbances. The stability analysis of synchronous generator under small disturbances is examined for SMIB & Multimachine system and three phase fault have been carried out. The SMIB system is predominant in local mode oscillations. These disturbances occur due to large reactive power, weak ties or large AVR gain with low time constant. However, it produces negative damping to the system which leads to electromechanical oscillations. To overcome the effect of negative damping, a supplementary control loop is provided by Power system stabilizers.

Conventional Power system stabilizers (CPSS) is widely used for enhancing system stability, but CPSS design can't guarantee its performances under heavy loading conditions. To overcome above problems, different robust multiple model adaptive controllers are designed using intelligent techniques like ANN, FLC, PSO and GA have been developed for different loading condition. The ANN is used to compensate the complex nonlinear dynamics of power system. To speed up the learning process, an adaptive signal is introduced to the ANN's weights updating rule so ANN can be directly used online without offline training process.

There is various method of problem solving for the optimal tuning of the parameters of the power system stabilizer for the proposed power system. The problem of selection of optimal parameters power system stabilizer is converted into an optimization problem and which is solved by GA & PSO with ts, tr, tp, os, IAE, ISE, ITAE and ISTSE indices. The real time stability simulations are available on the proposed controller has been demonstrated through the CCS v3.3 & ezdsp28335 to investigate the stabilization control performance. The simulation results show that higher performances ofcontrollers under different operating conditions and robustness using proposed techniques.