Abstract

The aim of this paper is to examine the effect of inclusion of a linear quadratic Gaussian controller instead of the conventional AVR with the existence of a PSS for improving the dynamic stability of power system. The present work introduces a computational methodology that adopted a Linear Quadratic Gaussian (LQG) controller to control the generator. In this method the models of both the synchronous generator and the PSS were assumed to be Linear, depending on this method the controller power consumption was minimized depending on some performance index, which is assumed to be Quadratic. The Two Degree of Freedom (2DOF) structure was adopted, in which two controllers are used, the first one is the LQG controller and the second one is the integral controller. The proposed controller has been checked and investigated with simulations run under Matlab environment on single machine infinite bus (SMIB) system and compared with the traditional design methods. From these results, it is clear that the LQG controller can enhances the steady state stability very clearly. The results also show that the use of the LQG controller increases the damping torque that substitutes the need to the Power System Stabilizer (PSS).

References

Damping Low Frequency Oscillations in Power System using Quadratic Gaussian Technique based Control System Design


Index Terms

Computer Science

Applied Sciences
Keywords
Linear quadratic Gaussian  integral control  alternating voltage regulator  single machine  steady state stability  two-degree-of-freedom.