

In this paper, a method for designing coordinated power system stabilizer (PSS) is presented. The proposed method is based on the reference model controller design. To this end, a model that is called single-machine non-infinite bus is presented for studying low frequency oscillations. Then a reference model is proposed for designing PSS based on the single-machine non-infinite bus model. Transfer functions of the understudy machine augmented with stabilizer are equated by transfer functions of the proposed reference model to compute the PSS's parameters. The damping of the reference model and consequently the damping of the designed PSS do not depend on the frequency of oscillations. Hence, the proposed PSS damps all intra-and inter-area oscillations and no in-coordination will happen among the system's stabilizers. Two PSSs are designed using the proposed method for a test power system. To demonstrate the efficiency of the proposed method, the performance of the proposed $\Delta\omega$ are compared with the performance of multi-band PSS4B, conventional ω , conventional Δp_{α} , and PSS designed based on particle swarm optimization. Robustness of stabilizers against variation of oscillations' frequency, variation of operating point, and existence of harmonics are used to measure their performances.

