



# Power System Dynamics: Stability and Control

By K. R. Padiyar

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About This book is divided into five sections. The first section begins by introducing the basic concepts of stability and goes on to review classical techniques of analysis based on classical machine model. This is meant to provide continuity between the old and new methods of analysis. This second section develops the system model in detail. Here it is discussed on how the generator model is derived starting from the basic circuit equations and the use of Park's transformation. The models of excitation system, turbine governor system and the models of SVC, transmission lines and loads are also discussed. The last part of this section with the help of illustrative examples explains how a single machine connected to infinite bus is a simple, yet realistic system which can be used to illustrate the features of power system dynamic problems. Section Three presents the small signal stability analysis applied to the problem of low frequency oscillations. In this analysis, the network transients are neglected. This section also introduces the problem and analysis methods using a single machine system. It also presents the power system stabilizer - design and applications and extends the analysis to multi-machine systems. Section Four begins by presenting the SSR phenomenon and methods of analysis and the solutions and counter measures to SSR. The study of transient stability problem by simulation is dealt in Section Five. It also deals with the direct methods of stability analysis using energy functions and discusses various controllers for improving the transient stability of power system. About the Software The floppy disk contains the software SIMSYN (Simulation of Synchronous Generator) and OPSSYN (Operating Point Stability of Synchronous Generator). This program can be run on any IBM compatible PC and MS DOS environment. With the help of the user manual and an interactive template, you will be able to exercise the problems found in Chapters 6 to 8.

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About the Author

K.R. Padiyar has been a Professor of Electrical Engineering at the Indian Institute of Science, Bangalore since 1987. He was on the Faculty at the Indian Institute of Technology, Kanpur from 1976 to 1987. His research interests are Power System Dynamics and Control, HVDC and Flexible AC Transmission Systems. He has authored the book HVDC Power Transmission Systems.

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