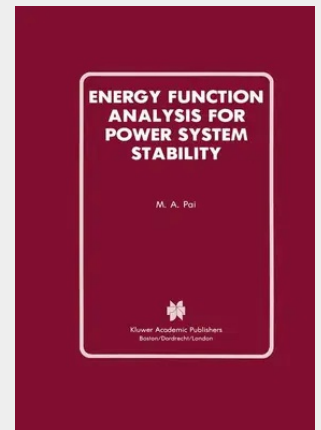


Energy Function Analysis for Power System Stability

This research monograph is in some sense a sequel to the author's earlier one (Power System Stability, North Holland, New York 1981) which devoted considerable attention to Lyapunov stability theory, construction of Lyapunov functions and vector Lyapunov functions as applied to power systems. This field of research has rapidly grown since 1981 and the more general concept of energy function has found wide spread application in power systems. There have been advances in five distinct areas (i) Developing energy functions for structure preserving models which can incorporate non-linear load models (ii) Energy functions to include detailed model of the generating unit i. e., the synchronous machine and the excitation system (iii) Reduced order energy functions for large scale power systems, the simplest being the single machine infinite bus system (iv) Characterization of the stability boundary of the post-fault stable equilibrium point (v) Applications for large power networks as a tool for dynamic security assessment. It was therefore felt appropriate to capture the essential features of these advances and put them in a somewhat cohesive framework. The chapters in the book roughly follow this sequence. It is interesting to note how different research groups come to the same conclusion via different reasons.

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