

電力系統穩定度分析之教學模擬系統

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中文摘要

電力系統穩定度分析是一個很複雜的計算過程，通常不容易從擺動方程式 (Swing Equation) 來觀察發電機轉子角擺動情形及判斷系統是否穩定，因此在教學上通常使用等面積穩定度準則 (Equal-Area Stability Criterion) 來簡化其過程，以得到一個近似解，但學生還是不能完全了解其實際現象。本文利用蘭吉庫達方法 (Runge-Kutta Methods) 及福傳語言 (FORTRAN Language) 程式，將傳統的教學方法輔以個人電腦的模擬系統，把轉子角的變化情形以圖形顯示出來，使學生對電力系統穩定度分析有具體的觀念。此外，學生可透過參數的設定，觀察系統參數變化時，對上述情形的影響。

關鍵字：教學；電力系統穩定度；電腦輔助教學

Abstract

Power Systems Stability Analysis is a very complicated process of calculation. It is not easy to observe the swing state of a generator rotor angle or judge the stability of the system by Swing Equation. Therefore, in teaching we usually use Equal Area Stability Criterion to simplify the process to get a proximate solution. Students, however, can not fully understand the real phenomena. In this paper, we use Runge-Kutta Methods and FORTRAN programs to aid the traditional instruction with simulate systems of a PC, and display the varying situations of a rotor angle with diagrams to impress students with a concrete concept. Besides, by setting parameters, students can observe the influence of varying system parameters upon the situations stated above.

Key words : Power system stability; Computer Assisted Instruction