

COURSE	Name : Small Signal Stability in Power Systems
	Code : EE185517
	Credit(s) : 2
	Semester : (Elective Course)

Description of Course

This course studies the stability of small disturbances in electrical power systems and how to control them. Designing controllers to improve stability due to small interference in the power system will be discussed. Controller design with several methods namely phase compensation, robust control and artificial intelligence. The steady state instability through analysis of the generator's maximum load through power tracing and the concept of losses will also be discussed. In addition, the steady state rotor generator instability due to leading operation, and prevent leading operations by observing the generator capability curve are also discussed.

Learning Outcomes

Knowledge

(P02) Mastering engineering concepts and principles to develop the necessary procedures and strategies for systems analysis and design in the areas of power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics.

Specific Skill

(KK01) Being able to formulate engineering problems with new ideas for the development of technology in power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics.

General Skill

(KU11) Being able to implement information and communication technology in the context of execution of his/her work.

Attitude

(S09) Demonstrating attitude of responsibility on work in his/her field of expertise independently.
(S12) Working together to be able to make the most of his/her potential.

Course Learning Outcomes

Knowledge

Mastering the concept of small disturbance stability and small stability simulation procedures in the power system and mastering the design concept of small disturbance stability control with several methods such as phase compensation, robust, artificial intelligence, series compensation and capability generator capability control.

Specific Skill

Able to design the controller with phase compensation method, robust and artificial intelligence with matlab simulink software and able to simulate steady state stability with matlab and ETAP.

General Skill

Able to use software such as matlab simulink and ETAP for simulation of small disturbance stability.

Attitude

Demonstrate a responsible attitude towards the work in the field of expertise Simulation and Analysis of the stability of small electrical power system interference independently.

Working together to be able to take full advantage of their potential.

Main Subjects

1. Basic concept of dynamic stability of electric power system.
2. Laplace transform model for generator and device, transmission and load.
3. Assemble the model in Simulink
4. Dynamic Stability Simulation in Simulink
5. Design of Controller with phase compensation method, robust and AI.
6. Basic concept of stable steady state electric power system.
7. Steady state models for generators and devices, transmissions and loads.
8. Find the maximum load with power tracing
9. Steady state stability simulation in Matlab / Etap
10. Capacitor series compensation
11. Leading generator operation and its limits
12. Prevent Leading operations

Reference(s)

- [1] Adi Soeprijanto, " Analisis Kestabilan Multi generator dengan pendekatan SMIB", Dee Press, 2017
- [2] Paul M Anderson, A.A. Fouad, "Power System Control and Stability, 2nd edition", Wiley-IEEE Press, 2002
- [3] Hadi Saadat, "Power System Analysis", McGraw-Hill Inc, 1999
- [4] Prabha Kundur, "Power System Stability and Control", McGraw-Hill, 1994

Prerequisite(s)

Power System Analysis
