

EXPERIMENT NO. 8

OBJECTIVE

LOAD – FREQUENCY DYNAMICS OF SINGLE AREA POWER SYSTEMS.

SOFTWARE USED

MATLAB (SIMULINK)

THEORY

Active power control is one of the important control actions to be performed for normal operation of the system to match the system generation with the continuously changing system load and in order to maintain the constancy of system frequency to a fine tolerance level. This is one of the foremost requirements in providing quality power supply. A change in system load causes a change in the speed of all rotating masses (Turbine – generator rotor systems) of the system leading to change in system frequency. The speed change from synchronous speed initiates the governor control (primary control) action result in the entire participating generator – turbine units taking up the change in load, stabilizing system frequency. Restoration of frequency to nominal value requires secondary control action which adjusts the load - reference set points of selected (regulating) generator – turbine units. The primary objectives of automatic generation control (AGC) are to regulate system frequency to the set nominal value and also to regulate the net interchange of each area to the scheduled value by adjusting the outputs of the regulating units. This function is referred to as load – frequency control (LFC).

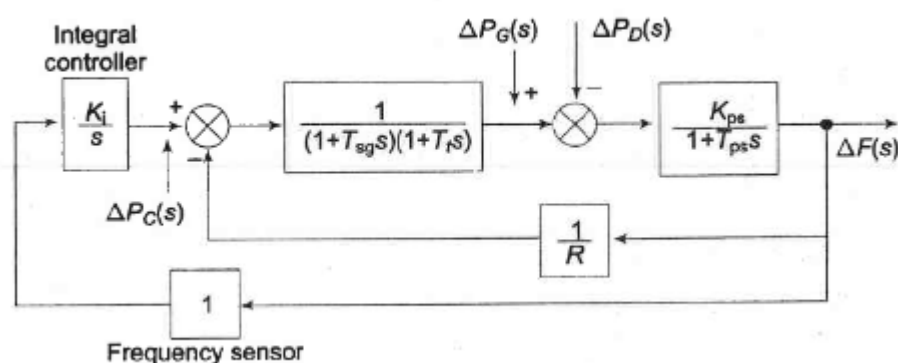


Fig.1 Proportional plus integral load frequency control

PROBLEM STATEMENT

Simulate the above proportional plus integral LFC using Simulink and plot the graphs

CONCLUSION

Modeling and analysis of the frequency and tie-line flow dynamics of a single area power system without and with load frequency controllers (LFC) was studied and responses are simulated using simulation software.

REFERENCES

- [1]. Stevenson Jr, W. D. (1982). *Elements of Power System Analysis*, (4th), Mc-Graw Hill Higher Education.
- [2]. Hadi Saadat, "Power System Analysis", Milwaukee School of Engineering, McGraw Hill, 1999.
- [3]. Kothari D. P., Nagrath I. J., "Modern Power System Analysis", Mc-Graw Hill Higher Education.

MATLAB CODE:

```
Tsg=.4  
Tt=0.5  
Tps=20  
Kps=100  
R=3  
Ksg=10  
Kt=0.1  
Ki=0.09
```

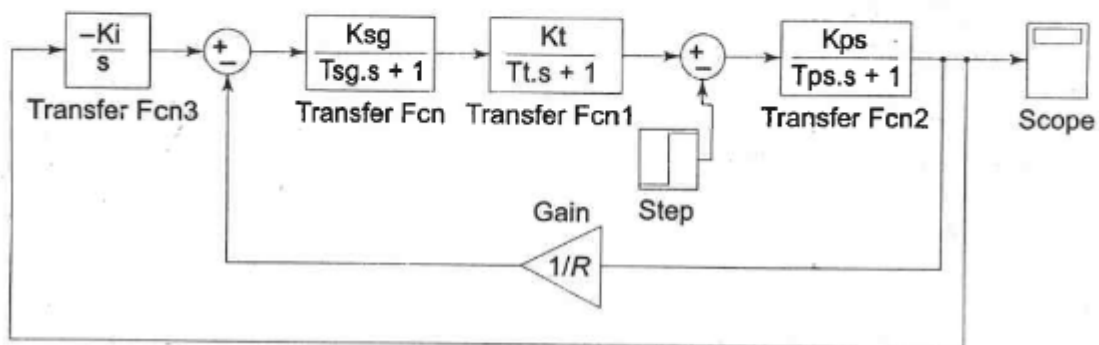


Fig.2 Simulation diagram of Proportional plus integral load frequency control