

5. A Study on the Development and Reliability Analysis of a Fault Tolerant Digital Governor

전기·전자제어공학과 신명철
지도교수 김윤식

In industrialized modern society, once a power plant has a failure, the damage is unaccountable and its impact is exerted on almost everywhere in the country. Therefore, reliability should be secured especially in case of turbine governor system to avoid this kind of damage. To secure safety and precise frequency control of power generation, a fault tolerant digital governor might be the answer.

This thesis aims at the development of a fault tolerant digital governor system for continuous and safe power supply. A fault tolerant digital governor, using duplex I/O module and triplex CPU module and also 2 out of 3 voting algorithm and adding self diagnostic ability, is designed to provide control performance and to improve the reliability of the control system.

System reliability is estimated by using the model of Markov process. The reliability of triplex system in mission time can be improved about 1.8 times in reliability 86[%], 2.8 times in 95[%], 6 times in 99[%] compared with a single control system. The designed digital governor system is applied to get the mathematical model of the steam turbine generator system of Buk-Cheju Thermal Power Plant. Simulation is carried out to prove the effectiveness of the designed digital governor system.

