

CPN Based Fault-Tolerance Performance Evaluation of Fieldbus for KNGR NPCS Network

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Abstract

In contrast with conventional Fieldbus researches which are focused on real time performance ignoring fault-tolerant mechanisms, the aim of this work is real-time performance evaluation of the system including fault. Because the communication network will be applied to Next Generation NPP, maintaining performance in presence of recoverable fault is important. To guarantee this in NPP Control Network, we should investigate the time characteristics of the target system in case of recoverable fault. If the time characteristics meet the requirements of the system, the faults will be recovered by Fieldbus recovery mechanisms and the system will be safe. But, if time characteristics can not meet the requirements, the faults in the Fieldbus can propagate to system failure. For this purpose, we classified the recoverable faults, made the formula which represents delays including recovery mechanisms and made simulation model. We applied the simulation model to KNGR NPCS with some assumptions. The outcome of the simulation is realistic delays of the fault cases which have been classified. From the outcome of the simulation and the system requirements, we can calculate failure propagation probability from Fieldbus to outer system.