Fault diagnosis based on controller modification - DTU Orbit (08/11/2017)

Fault diagnosis based on controller modification

Detection and isolation of parametric faults in closed-loop systems will be considered in this paper. A major problem is that a feedback controller will in general reduce the effects from variations in the systems including parametric faults on the controlled output from the system. Parametric faults can be detected and isolated using active methods, where an auxiliary input is applied. Using active methods for the diagnosis of parametric faults in closed-loop systems, the amplitude of the applied auxiliary input need to be increased to be able to detect and isolate the faults in a reasonable time. A negative effect of increasing the amplitude of the auxiliary input is that the disturbances in the external output will be increased and consequently reduce the closed-loop performance. This problem can be handled by using a modification of the feedback controller. Applying the YJBK-parameterization (after Youla, Jabr, Bongiorno and Kucera) for the controller, it is possible to modify the feedback controller with a minor effect on the closed-loop performance in the fault-free case and at the same time optimize the detection and isolation in a faulty case. Controller modification in connection with both fault detection and isolation will be discussed. Also passive fault diagnosis methods based on controller modification will be discussed

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