

Title: Comparison of MPC and Adaptive Fault Tolerance Controllers for Wind Turbine

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This paper presents the comparison of MPC and adaptive fault tolerance controllers for wind turbin system. Firstly two novels Linear Matrix Inequality (LMI) based adaptive state dependent feedback fault tolerant control strategies for the wind turbin system in the presence of bounded matched or mismatched disturbances and simultaneous occurrence of actuator faults including failure, loss of effectiveness, and stuck is considered. At next step an approach for MPC fault tolerant control (FTC) design of constrained for this system is presented. The proposed approachs are based on model predictive control (MPC) and fault estimation scheme. A supervisor unit also uses the fault modeling and correction of plant model per sampling time to accommodate simultaneous partial actuator faults. Both of the proposed FTC controllers guarantee to compensate actuator faults effects, and to attenuate disturbance effects. The merits of the proposed fault tolerant control schemes and the better performance of MPC controllers have been verified by the simulation on wind turbin model subjected to actuator faults.

Keywords — wind turbine, linear matrix inequality (LMI), fault tolerant control (FTC), model predictive control (MPC), robust adaptive control, actuator fault

Biography

Hadi Azmi is the PhD student of Control engineering at one of the most recognized universities in Iran, Department of Electrical Engineering at Shahid Beheshti University under supervision of Professor Alireza Yazdizadeh. He was qualified for a direct master program with National Foundation of Iranian Elite Students Project after my Bachelor degree. He is interested in doing research and Application on projects involving Automatic Control, Robust and Adaptive control, Fault Detection and Fault Tolerant Control, Nonlinear Controller Design, Optimal Control, and controller design for Nonlinear Non Minimum Phase Systems.

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