Fault Detection and Isolation in Sensors and Actuators of Wind Turbines

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Abstract : Due to the countries growing attention to the renewable energy producing, the demand for energy from renewable energy has gone up among the renewable energy sources; wind energy is the fastest growth in recent years. In this regard, in order to increase the availability of wind turbines, using of Fault Detection and Isolation (FDI) system is necessary. Wind turbines include of various faults such as sensors fault, actuator faults, network connection fault, mechanical faults and faults in the generator subsystem. Although, sensors and actuators have a large number of faults in wind turbine but have discussed fewer in the literature. Therefore, in this work, we focus our attention to design a sensor and actuator fault detection and isolation algorithm and Fault-tolerant control systems (FTCS) for Wind Turbine. The aim of this research is to propose a comprehensive fault detection and isolation system for sensors and actuators of wind turbine based on data-driven approaches. To achieve this goal, the features of measurable signals in real wind turbine extract in any condition. The next step is the feature selection among the extract in any condition. The next step is the feature selection among the extracted features. Features are selected that led to maximum separation networks that implemented in parallel and results of classifiers fused together. In order to maximize the reliability of decision on fault, the property of fault repeatability is used.

Keywords : FDI, wind turbines, sensors and actuators faults, renewable energy

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