

# **Abstract**

**Mostafa Ahmed Abdel Galil**

## **Application of multi-model fault diagnosis for an industrial system**

Since complete isolation of a fault set in an industrial plant using a single Fault Detection and Isolation (FDI) technique is so difficult, a hybrid fault detection techniques is preferred. An observer based technique is applied to isolate a certain unknown fault in an industrial boiler placed in Sidi Kerir Petrochemicals (SIDPEC) in a previous work [1]. A fault has been detected using single observer based method but it has failed to isolate it. Therefore in this work, a combined method of multi-model and parameter estimation fault diagnosis techniques (hybrid technique) is implemented here to diagnosis a real abnormal situation. The most important part of the boiler, which is called master loop, is addressed. The master loop is identified based on online data. The master loop has been subdivided into three parts named: fuel flow subsystem, airflow and burner subsystem and the whole system. Different fault scenarios are simulated on the identified models in order to validate the fault detection algorithm. Finally the fault diagnosis algorithm is applied on a real abnormal behavior to identify it. The fault is detected and accurately isolated.