

Statistical Kernel Estimators for Design of a Fault Detection, Diagnosis, and Prognosis System

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Abstract. This paper presents the concept of a fault detection system covering detection, diagnosis, and prognosis associated with them. To this aim procedures of data analysis and exploration, based on the nonparametric method of kernel estimators were applied. This method allows the useful characterization of probability distributions without arbitrary assumptions regarding their membership to a fixed class. The investigated system was proved to be effective with respect to both abrupt as well as slowly progressing symptoms of arising anomalies. This work has been aimed at the problem of fault detection in dynamical systems as objects of automatic control, although the general formula is universal and can be used for a wide range of tasks, also outside of engineering.

Key words: fault detection system, data analysis and exploration, nonparametric estimation, kernel estimators, control engineering.