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# Artificial immune systems applied to fault detection and isolation: a brief review of immune response-based approaches and a case study

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## Abstract

This paper aims to document the application of a new generation of Artificial Immune Systems (AIS) in fault detection and isolation problems. These kind of algorithms are able to explore normal and anomalous behavior evidences, however, they may often require a more explicit prior knowledge provided by experts, usually difficult to obtain in some practical cases. Thus, many immune inspired approaches applied to Fault Detection and Isolation (FDI) in the literature are based on negative selection algorithms. Considering these points, this work presents a review on three AIS approaches. Once reviewed and contextualized, the evaluated techniques are properly adjusted considering their main parameters and ways of processing data, and then, applied to a case study of Fault Detection and Isolation in order to provide a performance analysis of these techniques, according to their applicability to these problems.

*Keywords:* Artificial Immune Systems, Fault Detection and Isolation, Infectious Nonself Model, Danger Model, Anomaly Detection

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