



MULTI-LEVEL OPTIMIZATION OF NEGATIVE SELECTION ALGORITHM DETECTORS WITH APPLICATION IN MOTOR FAULT DETECTION

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ABSTRACT—This paper proposes a multi-level optimization strategy for the Negative Selection Algorithm (NSA) detectors, based on both the Genetic Algorithms (GA) and clonal selection principle. The NSA is a natural immune response-inspired pattern discrimination method. In our hierarchical optimization scheme, the NSA detectors are first optimized by the GA to occupy the maximal coverage of the nonself space. Next, these detectors are further fine-tuned and optimized using the Clonal Selection Algorithm (CSA) so as to achieve the best fault detection performance. This novel NSA detectors optimization approach is also examined with artificial data and a practical motor fault detection example.