

Gravitational Search Algorithm-Based Evolving Fuzzy Models of a Nonlinear Process

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Abstract

Implementation issues related to evolving Takagi-Sugeno -Kang (TSK) fuzzy models of a nonlinear process are offered. The nonlinear process is the pendulum dynamics in the framework of the representative pendulum-crane systems, where the pendulum angle is the output variable of the TSK fuzzy models. An online identification algorithm (OIA) is given, which continuously evolves the rule bases and the parameters of the TSK fuzzy models, adds new rules with more summarization power and modifies the existing rules and parameters. The OIA includes an input selection algorithm and a Gravitational Search Algorithm that updates the parameters in the rule consequents. The

evolving TSK fuzzy models are validated by experiments conducted on pendulum-crane laboratory equipment.

Keywords

Evolving Takagi-Sugeno-Kang fuzzy models Gravitational search algorithm
Implementation issues Pendulum Dynamics

Notes

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