

A Diversity-based Adaptive Synchronous-Asynchronous Switching Simulated Kalman Filter Optimizer

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Abstract:

The original Simulated Kalman Filter (SKF) is an optimizer that employs synchronous update mechanism. The agents in SKF update their solutions after all fitness calculations, prediction process, and measurement process are completed. An alternative to synchronous update is asynchronous update. In asynchronous update, only one agent does fitness calculation, prediction, measurement, and estimation processes at one time. In this study, synchronous and asynchronous mechanisms are combined in SKF. At first, the SKF starts with synchronous update. If no improved solution is found, the SKF changes its update mechanism. The decision to switch from synchronous to asynchronous or vice versa is made based on the information of the population. In this paper, population's diversity is used as switching indicator. Using the CEC2014 benchmark test suite, experimental results indicate that the proposed diversitybased adaptive switching synchronous-asynchronous SKF outperforms the original SKF significantly.

Keywords : Simulated Kalman Filter, Synchronous, Asynchronous.

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