A Fitness-Based Adaptive SynchronousAsynchronous Switching in Simulated Kalman Filter Optimizer

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Abstract:
Simulated Kalman Filter (SKF) is a populationbased optimizer introduced in 2015 that is based on Kalman filtering, which consists of prediction, measurement, and estimation processes. The original SKF algorithm employs synchronous update mechanism in which 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. Using the CEC2014 benchmark test suite, experimental results indicate that the proposed adaptive switching synchronous-asynchronous SKF outperforms the original SKF significantly.

Keywords: Asynchronous; Optimization; Synchronous; Simulated kalman filter