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Optimization: parallel stochastic methods and mixed termination rules

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Abstract: Parallel optimization is a potent tool for solving optimization problems across various domains. By harnessing multiple computational resources simultaneously, optimization methods can achieve faster convergence and improved performance. Parallel implementation involves executing multiple different methods concurrently, such as evolutionary algorithms, swarm-based optimization, or multiple restarts. The objective is the effective exploration of the search space and the attainment of optimal solutions in less time. However, defined termination criteria are crucial to prevent uncontrolled execution of the algorithm, thereby conserving computational resources and time. Within the scope of this study, a pioneering combination of termination rules and a mechanism for transferring the optimal solution among computational units is proposed. The proposed additions have been tested on a series of well-known optimization problems from relevant literature, and the results are reported.

Citation: Charilogis V.; Tsoulos I.G.; Gianni A.M; Optimization: parallel stochastic methods and mixed termination rules. *Journal Not Specified* **2023**, *1*, 0. https://doi.org/

Received:
Revised:
Accepted:
Published: