A hybrid Gray Wolf Optimizer and Sperm Swarm Optimization for Global Optimization

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Meta-heuristic optimization approaches can be categorized into five groups; swarm-based approaches, evolutionary-based approaches, physical-based approaches, ecology-based approaches, and human-based approaches. The idea of any hybrid optimization approach is to combine the features of couple approaches of the aforementioned categories to enhance the ability of the approach convergence. In this paper, a hybrid optimization approach called HGWOSSO is proposed based on the integration of two swarm-based approaches, namely Grey Wolf Optimizer (GWO) and Sperm Swarm Optimization (SSO). The aim behind this hybridization is to merge and enhance the capabilities of exploitation and exploration in both SSO and GWO to generate both varied strength. Multimodal of fixed-dimension, multimodal, and unimodal benchmarks functions possessed from the literature are utilized to check the solution quality and performance of the HGWOSSO variant. The results evinced that the local search in SSO increases the ability of the hybrid variant in solving the benchmarks functions, which outperforms significantly the GWO variant in terms of quality of solutions, and capability to reach the global optimum.

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