Solving Economic Dispatch Problems with Practical Constraints Utilizing Grey Wolf Optimizer

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ABSTRACT
This paper presents the application of a new meta-heuristic called Grey Wolf Optimizer (GWO) which inspired by grey wolves (Canis lupus) for solving economic dispatch (ED) problems. The GWO algorithm mimics the leadership hierarchy and hunting mechanism of grey wolves in nature. Four types of grey wolves such as alpha, beta, delta, and omega are employed for simulating the leadership hierarchy. In addition, the three main steps of hunting: searching for prey, encircling prey and attacking prey are implemented. In this paper, GWO was demonstrated and tested on two well-known test systems with practical constraints. A comparison of simulation results is carried out with those published in the recent literatures. The results show that the GWO algorithm is able to provide very competitive results for nonlinear characteristics of the generators such as ramp rate limits, prohibited zone and non-smooth cost functions compared to the other well-known meta-heuristics techniques.