Artificial Bee Colony Algorithm (ABC) is a viable optimization algorithm, based on simulating of the foraging behavior of honey bee swarm. This paper is examined the ability of Artificial Bee Colony algorithm for solving the Optimal Power Flow (OPF) problem considering the valve point effects in a power systems. The objective functions considered are: fuel cost minimization, the valve point effect and multi-fuel of generation units. The proposed algorithm is applied to determine the optimal settings of OPF problem control variables. The feasibility of the proposed algorithm has been tested on the IEEE 30-bus and IEEE-57 bus test systems, with different objective functions. Several cases were investigated to test and validate the robustness of the proposed algorithm in finding the optimal solution or the near optimal solution for each objective. Moreover, the obtained results are compared with those available recently in the literature. Therefore, the ABC algorithm could be a useful algorithm for implementation in solving the OPF problem.

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