

Abstract: Multiple bad data detection using binary PSO algorithm based on PC cluster system

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Abstract

Especially when bad data are mutually interacting, the detecting of multiple bad data may be difficult to handle, since the normalized or weighted residuals may become faulty. Then the problem of detecting bad data is considered as a combinatorial decision procedure. In this paper, the binary Particle Swarm Optimization (PSO) is used for the detecting of multiple bad data in the power system state estimation. The PSO, like other meta-heuristic algorithms, can handle constraints that would be troublesome in classical mathematical approach. However, population based algorithms require higher computing time to find optimal point. This shortcoming is overcome by a parallel processing of PSO algorithm. The parallel PSO algorithm is implemented on a PC cluster system with 8 personal computers. The proposed approach has been tested on the IEEE-14 and 118 bus systems. The results showed that the binary PSO based procedures behave satisfactorily in the detecting multiple bad data and computing time of parallelized PSO algorithm can be reduced without losing the quality of solution.

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