TWO NOVEL OPTIMIZATION STRATEGIES BASED ON PSO AND EDA FOR WATER DISTRIBUTION NETWORK DESGIN

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Abstract. Geographically The optimal design of a water distribution network (WDN) is a highly non-linear, multi-model, and constrained NP-hard combinatorial problem. Particle Swarm Optimization (PSO) is a typical meta-heuristic search algorithm inspired by the collective behavior of a migrating bird flock. It has been successfully introduced to solve the WDN optimization problem. However, the widely known premature convergence problem of PSO still needs to be addressed. This paper proposes two new PSO based hybrid models in which an Estimation Distribution Algorithm (EDA) is integrated into a standard PSO framework in order to prevent the optimization process from being trapped in local optima. Two famous benchmark networks from the literature are adopted to evaluate the performance of the proposed new algorithms. Thus far, the current extensive comparisons with previous work on the benchmark examples show that these new methods outperform many other previous models with regard to either the best result achieved or the efficiency of the algorithm.