عنوان مقاله:

Solving a Redundancy Allocation Problem by a Hybrid Multi-objective Imperialist Competitive Algorithm

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خلاصه مقاله:

A redundancy allocation problem (RAP) is a well-known NP-hard problem including the selection of elements and redundancy levels to maximize the system reliability under various system-levelconstraints. In many practical designing situations, reliability apportionment turns to be complicatedbecause of the presence of several conflicting objectives that cannot be combined into a singleobjective function. As in telecommunications, manufacturing and power systems are becoming more and more complex. It is becoming increasingly important to develop efficient solutions to the RAP,while requiring short developments schedules and very high reliability. In this paper, a new hybrid multi-objective imperialist competition algorithm (HMOICA), based on imperialist competitive algorithm (ICA) and genetic algorithm (GA) is proposed in multi-objective redundancy allocationproblems. In the multi-objective formulation, system reliability is maximized in which cost and volume of the system are minimized simultaneously. In addition, a response surface methodology (RSM) is employed for parameter tuning of ICA. The proposed HMOICA has also been validated by some examples with analytical solutions. It shows its superior performance compared to a non-dominatedsorting genetic algorithm (NSGA-II) and Pareto archive evolution strategy algorithm (PAES).

کلمات کلیدی:

Redundancy Allocation Problem,Response Surface Methodology,Multi-objective Optimization,Imperialist Competitive Algorithm