

Fair Performance Comparison of Evolutionary Multi-Objective Optimization Algorithms

In the last three decades, a wide variety of evolutionary multi-objective optimization (EMO) algorithms have been proposed in the literature. In each study, it was demonstrated that the proposed algorithm outperformed other algorithms through computational experiments on test problems. Visual comparison and performance indicator-based comparison (such as hypervolume, IGD and IGD+) are usually used for evaluating EMO algorithms. However, it is very difficult to compare EMO algorithms in a fair manner. This talk explains a number of issues related to fair performance comparison of EMO algorithms. The discussed topics include (i) visual comparison of solution sets of a many-objective problem, (ii) termination condition in computational experiments, (iii) population size specification, (iv) choice of performance indicators, (v) reference point specification for hypervolume calculation, (vi) reference point set specification for IGD and IGD+ calculation, and (vii) choice of test problems. Using experimental results, it is clearly demonstrated that totally different comparison results can be obtained depending on the settings related to these issues.