

Talk 1

Title: Recent Advances in Evolutionary Multi-Objective Optimization

Abstract

In our daily lives we are inevitably involved in optimization problems. How to get to the university in the least possible time is a simple optimization problem that we encounter every morning. Just looking around ourselves we can see many other examples of optimization problems even with conflicting objectives and higher complexities. It is natural to want everything to be as good as possible, in other words optimal and any new development in optimization which can lead to a better solution of a particular problem is of considerable value to science and industry. The difficulty arises when there are conflicts between the different goals and objectives. Indeed, there are many real-world optimization problems with multiple conflicting objectives in science and industry, which are of great complexity. We call them Multi-objective Optimization Problems.

Over the past decade, lots of new ideas have been investigated and studied to solve such optimization problems. Among these methods, Evolutionary Multi-objective Optimization (EMO) algorithms are shown to be quite successful and have been applied to many applications.

This talk addresses the recent advanced topics in the area of evolutionary multi-objective optimization and contains the following content:

- Classical approaches for solving multi-objective optimization (MO) problems, definitions and theoretical foundations for EMO
- State-of-the-art Evolutionary multi-objective algorithms
- Large-scale EMO: large-scale decision space and many objective optimization, corresponding test benchmark such as Distance Minimization Problem and its variants for dynamic MO problems
- Evaluation mechanisms (Design of experiments, test problems, metrics, visualization)