Multipopulation Evolution Framework for Multifactorial Optimization

**ABSTRACT**

Multifactorial Optimization (MFO) has been attracting considerable attentions in the evolutionary computation community. In this paper, we propose a generic multipopulation evolution framework (MPEF) for MFO, wherein each population has its own random mating probability (rmp) and is used to for its own task. The benefits of using MPEF are twofold: 1) Various powerful well-developed evolutionary algorithms (EAs) can be easily embedded into MPEF for solving the task(s) of MFO problems; 2) Different populations can implement different genetic material transfers. Moreover, for instantiation, we embed a very popular and effective differential evolution algorithm, namely SHADE, into MPEF to form a multipopulation DE algorithm (MPEF-SHADE) for solving MFO problems. The experimental results on nine MFO benchmark problems show that MPEF-SHADE is significantly better than or at least competitive with SHADE, and it is also very superior to other multifactorial evolution algorithms, such as MFEA, MFDE and MFPSO.

This paper will be presented in GECCO2018, July, 15-19, 2018, Kyoto TERRSA, Kyoto, Japan.

Supervisor: Prof Zhang Qingfu

Research interest: Evolutionary computation

All are welcome!