

Title: Recent Advances in Evolutionary Multi-Criterion Optimization

Abstract:

Evolutionary multi-criterion optimization (EMO) has become an established subfield within the evolutionary computation (EC) field, simply because of its importance to practical problems. Real-world problems usually involve multiple conflicting criteria and resulting outcomes in these problems are a number of trade-off solutions. EC methods became useful in solving these problems compared to their classical counterparts, since they can find and store multiple solutions in their populations and they provide an implicit parallel search. The EMO research was started in early nineties (more than two decades ago) and many different methodologies have been suggested since then. Software companies have emerged having specialized products for solving multi-criterion problems in industrial set-ups.

In the past 20 years, besides developing new methodologies, EMO field has also found new directions for research and application, which are relatively unknown to many EC researchers who are not directly working in EMO area. Some of these new ideas have deep-rooted applications to other EC areas and EMO researchers can borrow key EC findings to improve EMO algorithms and applications. The new ideas need to be explored and nurtured further, requiring deep theoretical, algorithmic, and application-oriented studies. In this tutorial, we shall introduce and discuss some of the recent advances in EMO field so that EC researchers and practitioners, in general, and EMO researchers, in particular, can make a comprehensive scope and directions of research in EMO area.

Short Bio of K. Deb:

Kalyanmoy Deb is Koenig Endowed Chair Professor at Department of Electrical and Computer Engineering in Michigan State University, USA. Prof. Deb's research interests are in evolutionary optimization and their application in multi-criterion optimization, modeling, and machine learning. He has been a visiting professor at various universities across the world including IITs in India, Aalto University in Finland, University of Skovde in Sweden, Nanyang Technological University in Singapore. He was awarded Infosys Prize, TWAS Prize in Engineering Sciences, CajAstur Mamdani Prize, Distinguished Alumni Award from IIT Kharagpur, Edgeworth-Pareto award, Bhatnagar Prize in Engineering Sciences, and Bessel Research award from Germany. He is fellow of IEEE, ASME, and three Indian science and engineering academies. He has published over 450 research papers with Google Scholar citation of over 104,000 with h-index 104. He is in the editorial board on 20 major international journals. More information about his research contribution can be found from <http://www.coin-laboratory.com>.