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Topic: Recent Advances in Evolutionary Multi-Criterion Optimization and Future Studies

Abstract:

Practical optimization problems are hardly comprised of a single objective, as often they must be considered from a multi-disciplinary point of view. Multi-objective optimization problems give rise to a set of trade-off optimal solutions, from which one has to be chosen at the end. However, the knowledge of a diverse trade-off solution provides the user with plethora of information about the problem that are priceless and otherwise difficult to obtain. In this talk, we present some state-of-the-art methodologies of a fast-growing field of evolutionary multi-objective optimization (EMO) and showcase the advantages of using EMO methodologies for applied engineering problem solving tasks. Some specific issues of handling uncertainties leading to robust and reliability-based optimization, meta-modeling to deal with computationally expensive problems, many (10+) objectives, large-dimensional spaces, and multi-criterion decision making to choose a single preferred solution will be discussed with engineering case studies. Due to the availability of multiple trade-off solutions, EMO allows a practitioner to analyze the solutions to reveal important and innovative problem knowledge that are common to them. Different 'innovization' procedures will be illustrated by means of a number of engineering design and control problems.

Bio:

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 IEEE CIS EC Pioneer award, 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 500 research papers with Google Scholar citation of over 144,000 with h-index 120. He is in the editorial board on 18 major international journals. More information about his research contribution can be found from <http://www.egr.msu.edu/~kdeb>.