

An Evolutionary Algorithm Approach to Generate Distinct Sets of Non-Dominated Solutions for Wicked Problems

Marcio Giacomoni, Ph.D.

Assistant Professor, Department of Civil and Environmental Engineering
The University of Texas at San Antonio

Friday, February 16, 2018, 2:00pm – 2:50pm, Location: BB 3.03.24

Abstract

Many engineering design problems must optimize multiple objectives. While many objectives are explicit and can be mathematically modeled, some goals are subjective and cannot be included in a mathematical model of an optimization problem. A set of alternative non-dominated fronts that represent multiple optima for problem solution can be identified to provide insight about the decision space and to provide options and alternatives for decision-making. This seminar presents a new algorithm, the Multi-objective Niching Co-evolutionary Algorithm (MNCA) that identifies distinct sets of non-dominated solutions which are maximally different in their decision vectors and are located in the same non-inferior regions of a Pareto front. MNCA is demonstrated to identify a set of non-dominated fronts with maximum difference in decision vectors for a set of real-valued problems.

Biography



Originally from Porto Alegre, Brazil, Dr. Marcio Giacomoni earned his bachelor's degree in Civil Engineering from the University of Brasilia and a master's in Water Resources and Environmental Engineering from the Institute of Hydraulics Research at the Federal University of Rio Grande do Sul, Brazil. He then moved to the United States to pursue a Ph.D. in Civil Engineering and Water Resources from Texas A&M University. In January 2013, he joined the Department of Civil and Environmental Engineering at UTSA. His long term goal is to develop and sustain a career as a teacher-scholar focused on methodologies that identify effective water management strategies that enhance the sustainability of the built and natural environments, and transform this knowledge into action by training the next generation of water planners and managers with state-of-the-art knowledge and tools.