

ME 685 Evolutionary Computation (3-0-0-6)

Introduction to optimization, Convex programming, Karush-Kuhn-Tucker conditions, Direct functional evaluation and derivative based optimization techniques; Simulated annealing, Tabu search; NFL theorem; Biological principles of evolution, General scheme of EAs, Representation, Selection schemes, Population evaluation, Variation operators; Constraint handling; Schema theorem; Binary coded genetic algorithm, Real coded genetic algorithm, Evolutionary strategies, Evolutionary programming, genetic programming, Differential evolution, Particle swarm optimization; Pareto-optimality, Multi-objective evolutionary algorithms; Statistical analysis of EC techniques; Customization in EAs; EAs in scheduling.

Textbooks:

- [1] K. Deb, Multi-objective Optimization using Evolutionary Algorithms, Wiley, 2001.
- [2] M. Clerc, Particle Swarm Optimization, ISTE, 2006.

References:

- [1] T. Back, D. B. Fogal, Z. Michalewicz, Handbook of Evolutionary Computation, Oxford University Press, 1997.
- [2] D. B. Fogel, Evolutionary Computation, The Fossil Record, IEEE Press, 2003.
- [3] D. Goldberg, Genetic Algorithms in Search, Optimization, and Machine Learning, Addison Wesley, 1989.
- [4] K. Price, R. M. Storn, J. A. Lampinen, Differential Evolution: A Practical Approach to Global Optimization, Springer, 2005.