

Soft Computing محاسبات نرم در مهندسی عمران - طرح درس 1

- Primarily students meant to know how to program with MATLAB
- Some MATLAB-based-problems-solving assignments to be handed in by students
- Introduction to Optimization in Engineering
- Familiarizing with the concepts of optimization through some problems.
- Objective functions
- Different types of design variables
- Different types of design constraints
- What is size optimization?
- What is shape optimization
- What is Topology optimization?
- How to convert a Physical to a Mathematical model – Stdnts assignments to be handed in
- Solving Linear Programming problems schematically
- What do we mean with Simplex Method
- What are One and Two Phases Simplex Operations
- Optimization procedure by hand for a two-variable constrained structural problem-A three-member Truss Problem
- Difference between a Mathematical Gradient-based and Stochastic optimization algorithms
- A detailed taught course about genetic algorithm- Some chapters from my Book
- A step-by-step Performance of GA through optimizing a truss problem
- Sharing a MATLAB-based source code developed for genetic algorithm
- What is the difference between Binary and Real design variables and how they operate
- Difference and Liabilities of discrete, semi discrete and continuous valuables
- Their applications to many structural problems
- What is Rebirthing in Stochastic Optimization and why is it important
- Project for students to run few problems
- Introducing different types of Stochastic Optimization Algorithms
- What is Particle Swarm Optimization algorithm- Amin Ghorbani dissertations

- Project for students to run few problems
- What is Ant Colony Optimization algorithm-Amin Ghorbani and Farshchin dissertations
- Project for students to run few problems
- Project for students to understand and work with an arbitrary stochastic optimization algorithm different to what lectured and problems solved
- What do we mean with Multi-Objective Optimization-Farshchin and Varaie dissertations
- Getting ready for a practical exam running programs
- Neural Networks (NN) and their applicability in an optimization procedure-Miss Taheri dissertation
- ANFYS and their applicability in an optimization procedure-Miss Hosseini dissertation
- Final Assignments: Projects to use built-in NN in MATLAB and apply to few problems (related and not related to optimization)