

MATH 4320/8326 Computational Operations Research

MW 7:00-8:15pm | DSC 169 | Dr. Fabio Vitor

Prerequisite: MATH 3200 and MATH 4300 or permission of instructor.

Operations research is a scientific approach to decision making that seeks to best design and operate a system, usually under conditions requiring the allocation of scarce resources. Operations research saves lives, saves money, and solves problems. Operations research models are used daily to **optimize** systems from several industries including:

- Logistics, transportation, and supply chain
- Financial systems
- Manufacturing
- Health care, medicine, and public health
- Oil, chemical, and mining industries
- Food and energy systems
- Agriculture
- Military and defense



This is a *project based course* that will focus on the computational aspects of optimization models. The course will cover optimization software, approaches to solve large-scale and hard optimization models, and the computer implementation of other important optimization algorithms.

Optimization Software



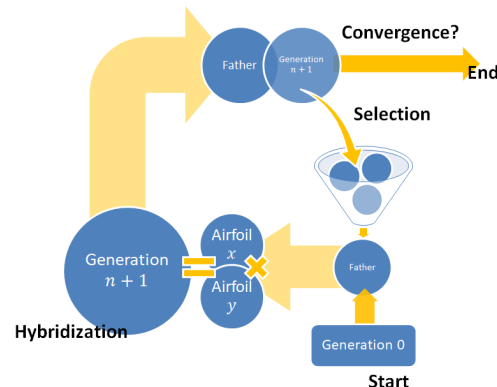
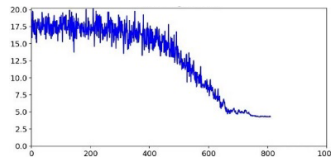
Modeling Languages and Solvers

- Optimizing **real-world** problems using **real data**
- Interfacing modeling languages with solvers
- Choosing preprocessing and solver parameters
- Scripting and postprocessing
- Delivering solutions
- Strategies best learned through practice

Solving Large-Scale and Hard Optimization Models

Some of the Computer Solution Methods Covered

- Approximation Algorithms
 - Good, better, best, and better than best approximations
 - Worst-case vs. average-case analysis
- Heuristics and Metaheuristics
 - Neighborhood and local search
 - Tabu search
 - Evolutionary algorithms
 - Genetic algorithms
 - Simulated annealing
 - Ant colony



Do you want to learn the impact of operations research? Visit <https://youtu.be/9-MITCoka-Q>



For More Information:

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