

MATH/CSCI 4310/8316 Probabilistic Operations Research Models

MW 5:30-6:45pm | Dr. Fabio Vitor

Prerequisite: MATH 2050 and either MATH 4740/8746 or STAT 3800/8805, 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 models can be used to determine public health and disease prevention/treatment policies, optimize city logistics and humanitarian supply chain operations, improve production planning and manufacturing processes, establish governmental policies for water and energy, help the military and defense build technologies and more effective procedures, improve operations of the airline industry, etc.

Probabilistic operations research models are frequently used to model systems that are extremely complex, and uncertainty is present. These models use probability to determine behaviors that are uncertain or unknown.

This course will study some of the main probabilistic operations research models and methods such as **decision analysis, probabilistic inventory models, forecasting models, Markov decision processes, queueing theory, simulation, and game theory**

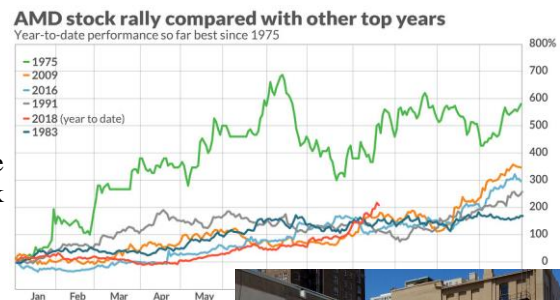
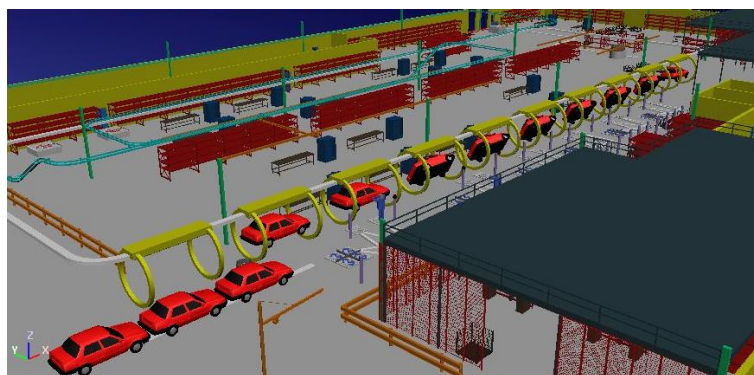
Some Practical Examples

Stock Market

The daily price of a stock can be described as a **Markov chain**, i.e. the probability distribution of tomorrow's price for one share of the stock depends only on today's price.

Urban Emergency Services

How long, on average, patients will wait for an ambulance? What is the fraction of time ambulances are idle? What is the expected number of patients transported per hour? These questions can be answered using **queueing theory**.



Bottleneck in a Production Process

What station is the bottleneck (point of congestion in a production system) of an automobile assembly line? What improvement scenarios can be proposed to eliminate or improve this bottleneck to increase production throughput? These questions can be answered using **simulation**.

SIGN UP FOR THIS COURSE TO LEARN MORE!

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

For More Information:

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