Discrete Event Systems
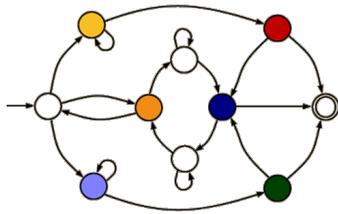
Introduction

Laurent Vanbever

nsg.ee.ethz.ch

ETH Zürich (D-ITET)

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Discrete Event Systems

Discrete Event Systems

Why should you care?

Being based on natural phenomena,
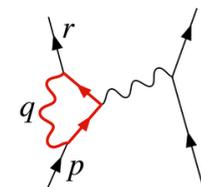
Science is often explained by continuous variables

$$F = G\frac{m_1 m_2}{r^2}$$

Mechanics   Gravitation   Electrodynamic

Being based on natural phenomena,
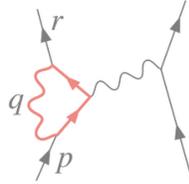Science is often explained by continuous variables

Many complex systems are not continuous…

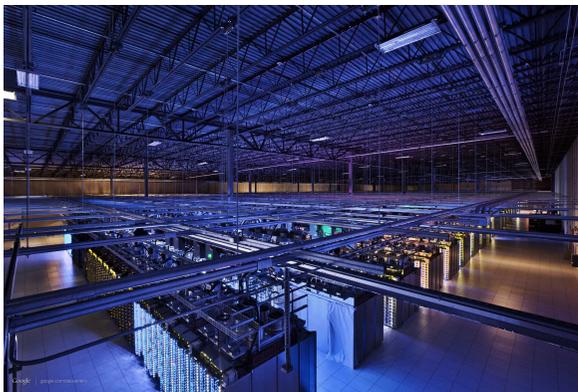$$F = G\frac{m_1 m_2}{r^2}$$

Mechanics   Gravitation   Electrodynamic
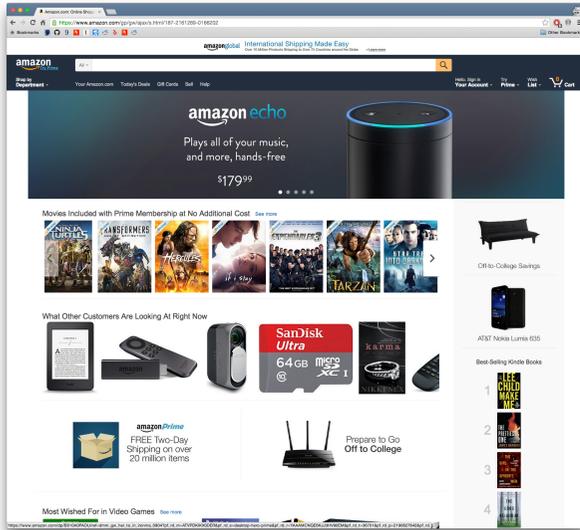
solved by differential equations

computer
systems

transportation
systems

Somewhere inside Google datacenters

NYC subway system

amazon.com home page

software
systems

Those systems are determined by
discrete events

Customers requests

Telephone calls

Train arrivals

Incoming data

Equipment failures

…

In this course, you'll learn how to

Model

Analyze

Design   Discrete Event Systems

Test

Optimize

some examples

Model   automata & petri nets

Analyze   average-, worst-case viewpoint

Design   out of a specification

Test   proof system properties

Optimize   minimize the system size

There will be 3 lecturers in the course

Part I	Part II	Part III		Week 1-4	Week 5-9	Week 10-13
Laurent Vanbever	Roger Wattenhofer	Lana Josipović		Laurent Vanbever	Roger Wattenhofer	Lana Josipović
Automata	Stochastic process	Specification model		Automata	Stochastic process	Specification model

Course organization

Lectures	Thursday 2pm–4pm
	@HG D 7.2
Exercices	Thursday 4pm–6pm
	@HG D 7.2
Materials	https://disco.ethz.ch/courses/des/