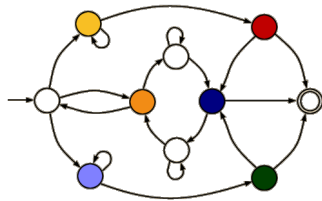


Discrete Event Systems

Introduction



Laurent Vanbever

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ETH Zürich (D-ITET)

September, 20 2018

Discrete Event Systems

Discrete Event Systems

Why should you care?

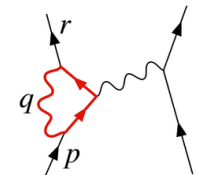
Being based on natural phenomena,
Science is often explained by continuous variables



Mechanics

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

Gravitation



Electrodynamic

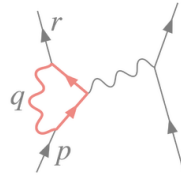
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Mechanics

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

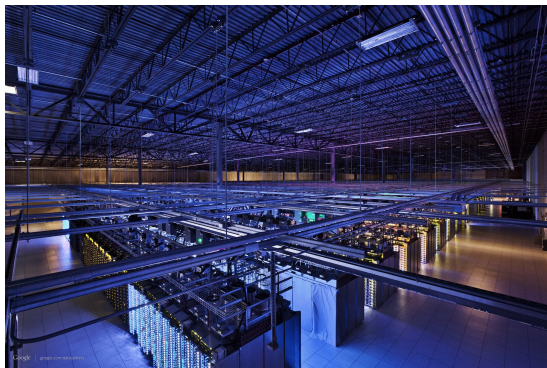
Gravitation



Electrodynamic

solved by differential equations

Many complex systems are not continuous...



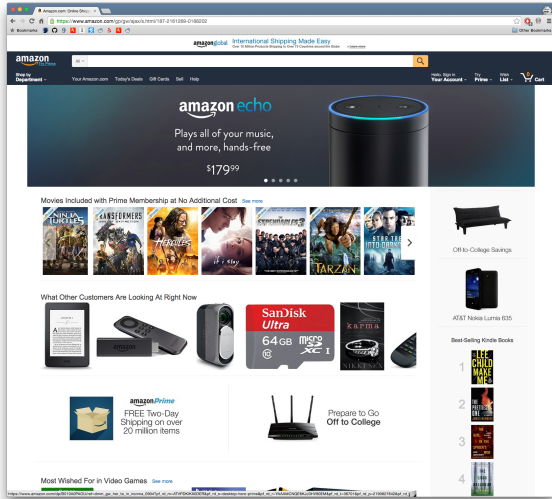
computer
systems

Somewhere inside Google datacenters



transportation
systems

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
 - Test
 - Optimize
- Discrete Event Systems

some examples

- Model
 - Analyze
 - Design
 - Test
 - Optimize
- automata & petri nets
 - average-, worst-case viewpoint
 - out of a specification
 - proof system properties
 - minimize the system size

There will be 3 professors in the course

Part I



Laurent Vanbever

Automatas

Part II



Roger Wattenhofer

Stochastic process

Part III



Lothar Thiele

Specification model

Week 1-5



Laurent Vanbever

Automatas

Week 6-10



Roger Wattenhofer

Stochastic process

Week 11-13



Lothar Thiele

Specification model

Course organization

Lectures

Thursday 1pm-3pm

@ETZ E 6

Exercices

Thursday 3pm-5pm

@ETZ E 6

Materials

<http://www.disco.ethz.ch/lectures/des/>