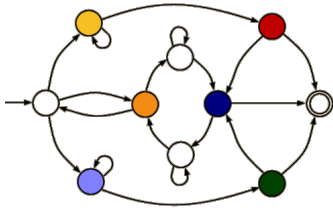


# Discrete Event Systems

## Introduction



Laurent Vanbever  
www.vanbever.eu

ETH Zürich (D-ITET)  
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# Discrete Event Systems

## Discrete Event Systems

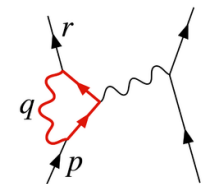
Why should you care?



Mechanics

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

Gravitation



Electrodynamic

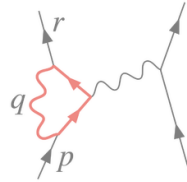
Being based on natural phenomena,  
Science is often explained by continuous variables



Mechanics

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

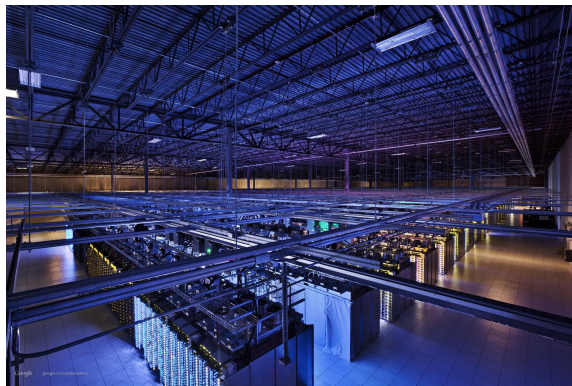
Gravitation



Electrodynamic

solved by differential equations

Many complex systems are not continuous...



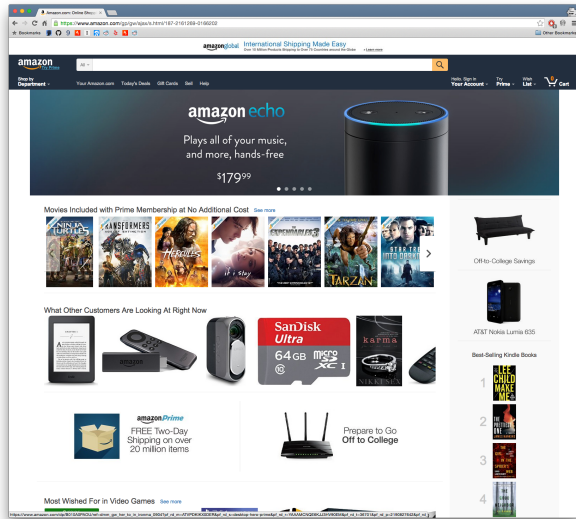
Somewhere inside Google datacenters

computer  
systems



NYC subway system

transportation  
systems



software systems

amazon.com home page

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/>