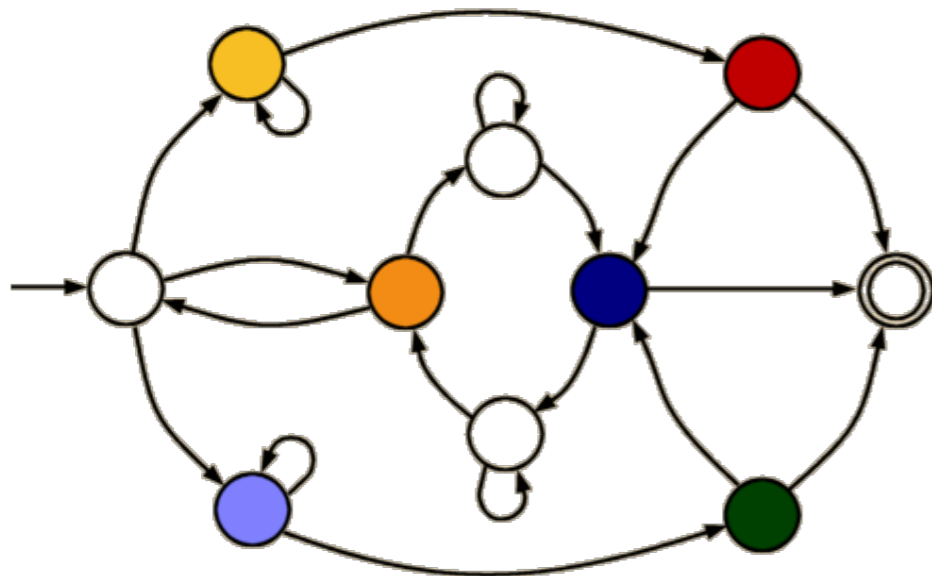


# Discrete Event Systems

## Introduction



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ETH Zürich (D-ITET)

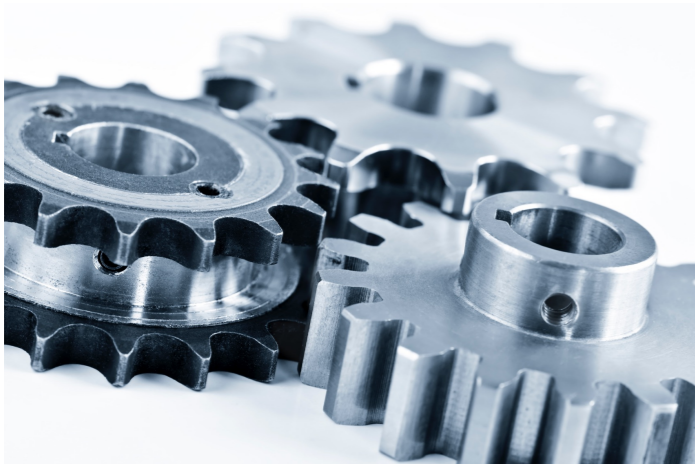
19 September 2019

# Discrete Event Systems

# Discrete Event Systems

**Why** should you care?

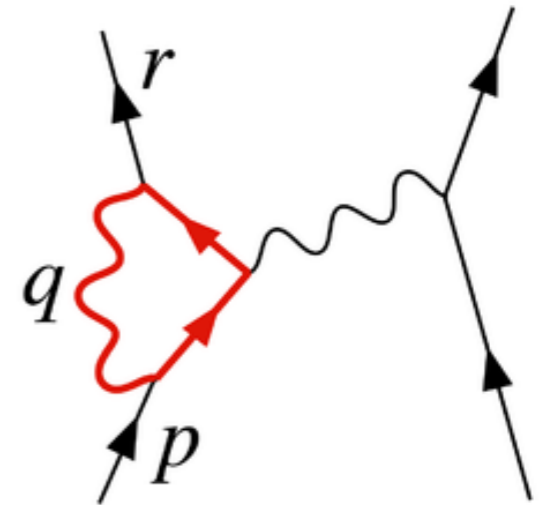
Being based on natural phenomena,  
Science is often explained by continuous variables



Mechanics

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

Gravitation



Electrodynamic

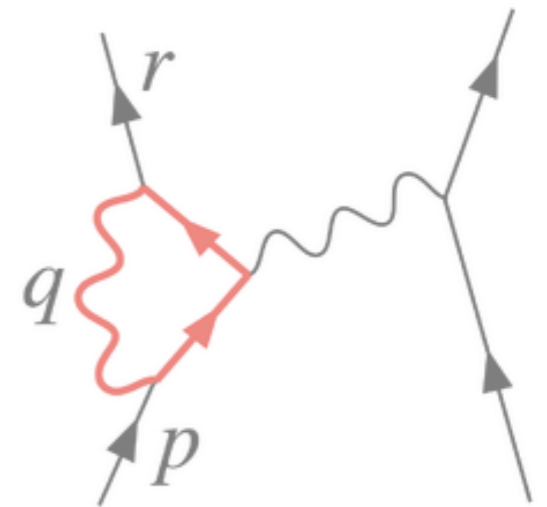
Being based on natural phenomena,  
Science is often explained by continuous variables



Mechanics

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

Gravitation



Electrodynamic

**solved by differential equations**

Many complex systems are not continuous...





computer  
systems

Somewhere inside Google datacenters

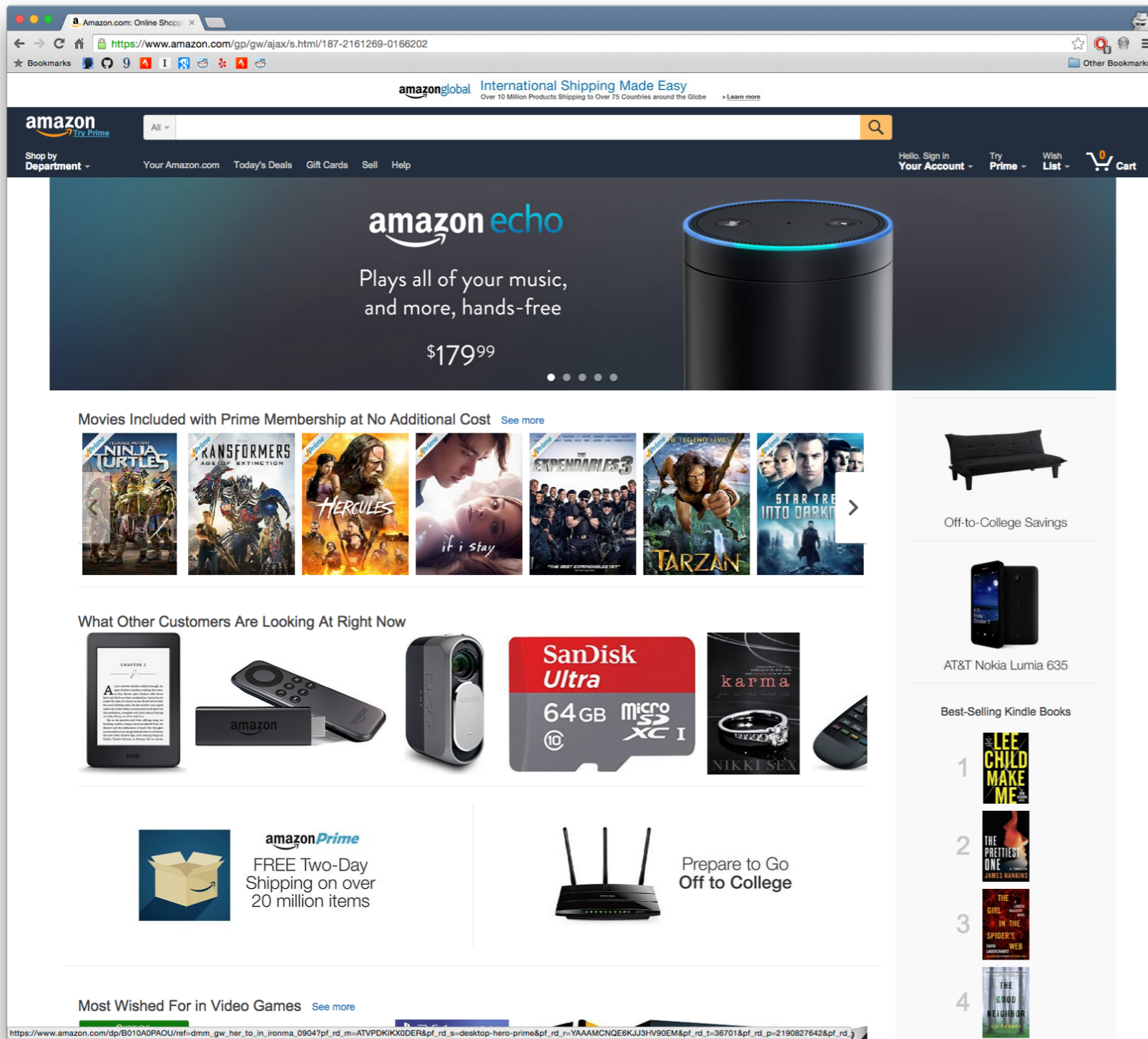




transportation systems

NYC subway system





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

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 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 1 pm-3pm

@ETZ 9

Exercices

Thursday 3pm-5pm

@ETZ 9

Materials

<https://disco.ethz.ch/courses/des/>