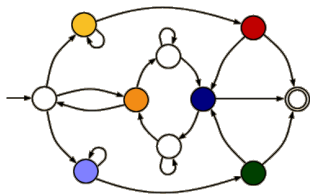


Discrete Event Systems

Introduction



Laurent Vanbever

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ETH Zürich (D-ITET)

17 September 2026

Discrete Event Systems

Discrete Event Systems

Why should you care?

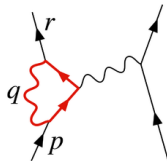
Being based on natural phenomena,
Science is often explained by continuous variables



Mechanics

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

Gravitation



Electrodynamic

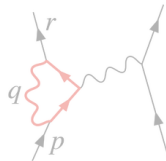
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Mechanics

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

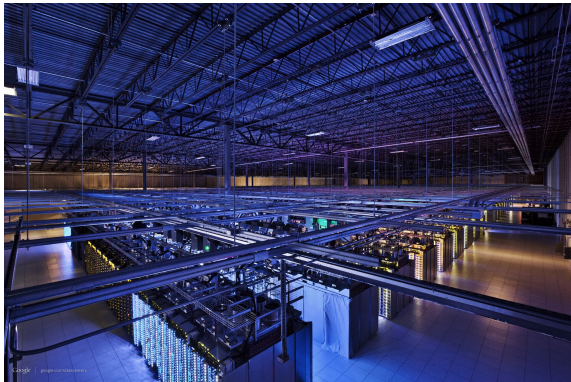
Gravitation



Electrodynamic

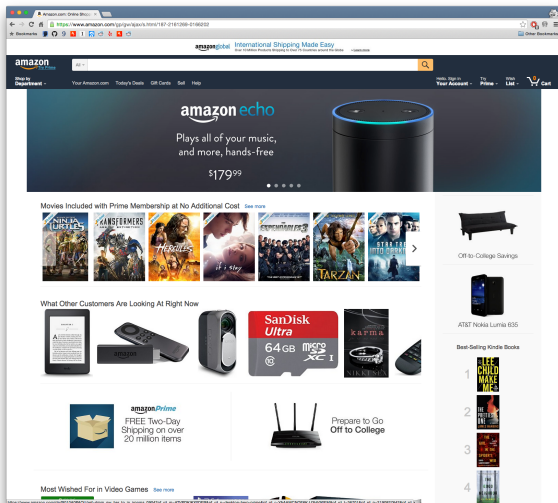
solved by differential equations

Many complex systems are not continuous...



computer
systems

Somewhere inside Google datacenters



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

There will be 2 lecturers in the course

Part I & II



Laurent Vanbever

Automata & stochastic processes

Part III



Lana Josipović

Formal verification

There will be 2 lecturers in the course

Week 1–8



Laurent Vanbever

Automata & stochastic processes

Week 9–14



Lana Josipović

Formal verification

Course organization

Lectures

Thursday 2pm–4pm

@HG D 7.2

Exercises

Thursday 4pm–6pm

@HG D 7.2

Materials

<https://des.ethz.ch>

lecture recordings on video.ethz.ch