CONTROL ENGINEERING WITH PYTHON

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RESOURCES

https://github.com/boisgera/control-engineering-with-python

DEFINITIONS

W DEFINITIONS

Control engineering or **control systems engineering** is an engineering discipline that applies automatic control theory to design systems with desired behaviors in control environments.

The discipline of controls overlaps and is usually taught along with electrical engineering at many institutions around the world.

Control theory in control systems engineering is a subfield of mathematics that deals with the control of continuously operating dynamical systems in engineered processes and machines.

A **dynamical system** is a system in which a function describes the time dependence of a point in a geometrical space.

Examples include the mathematical models that describe the swinging of a clock pendulum, the flow of water in a pipe, and the number of fish each springtime in a lake.

Control Theory is about **dynamical systems** : their

- Modelling,
- Analysis and
- Control.

EXAMPLES

⚙ ROBOTIC ARMS

DEMO: $2k\pi$ (CAS)

✈ AIRCRAFTS

- Boeing 737 Max Plane Crashes
- The Dangerous Flaw in Boeing’s Automated System
- Accident Preliminary Report: 
- What is the Boeing 737 Max MACS?
- Boeing 737 Max adjustable stabilizer
- Boeing 737 Max cleared to fly again ‘too early’
- Eurofighter Typhoon

TOMORROW'S VEHICLES

Typically : vehicles with self-driving capabilities.

- Waymo ("Google Car"),
- Tesla: Autopilot, Semi (truck),
- Uber: ATG
- ...

TODAY'S CARS

ADAS = Advanced Driver-Assistance Systems

1. Collision avoidance systems (CAS) (W)
2. Cruise control (CC) (W)

Adaptative cruise control = CAS + CC (YouTube : IIHS)

3. Electronic stability control (ESC) (W)