ELL 333

Lecture

27.07.2018

(Ch 3, 5, 6) DESIGN of bicycle control

- Model: Dynamics, Stability
  - what are variables? what is input/output?
  - How does stability depend on parameters?
- Specifications

http://bicycle.tudelft.nl/yellowbicycle/

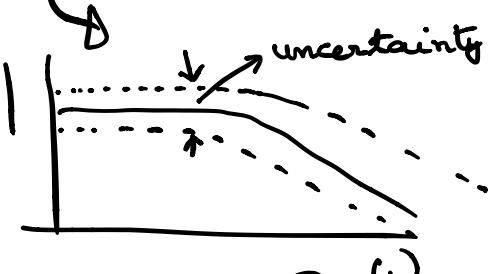
Ch 7 → Can these be met? [controllability/reachability] (assuming all information for feedback is there)

Ch 8 → Can these be met with less than complete information? [Observability]

→ If these specifications can be met, then what is the "best" solution? [Optimality] (Ch 7, 8)

- Relation to Frequency Domain techniques (Ch 9, 10, 11, 12)

$$A = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & & & \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{bmatrix}$$



How to characterize uncertainty?

→ Robust Control Ch 13

Whether the specifications can be continued to be met when there are uncertainties

- internal: model parameters may not be known
- external; road conditions may change for bicycle.

Ch 1, 2, 4 → General Introduction + Examples