Project Thesis

Open Topic

- 20-30 hours

- learning period

Do First:

1) • Code MPC-schemes

↳ casADi - Packages

- example code

2) • Code sensitivities ↳ $x, u = \underset{u,x}{\text{argmin}}$

$V(x_0)$

↳ $\nabla_\theta V$

3. Apply RL on MPC

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1-3 Starting grounds

- Not tried

• Fairly rich param of cost function $L_\theta(x, u)$

↳ how to force convexity?

RL

- Q-learning
- Policy ∇ } merging the Two

↳ ~~Designed To be MC~~

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RL : L_{true} (: $\neq L_\theta$

L_θ

$\pi_\theta(x)$ $\nabla_\theta \pi_\theta$

- Stability

- RL ∇o force MIC stability on its constraints

- Application ?

Ipopt Solver

↳ Included in CasADi

Vars

- Dynamic programming → theoretically perfect e.g. ~2-3 states
  ↳ Tool to calc inf horizon

- $F(x, u) = x_+$
- $P(x_+ | x, u)$ ← (x+) random process

- $u = \pi(x)$ s.t. $\min_{\pi} \sum_{k=0}^{\infty} L(x_k, u_k)$

- DP - Verifying algorithms

- Paper writing ATM
  - Mixed-integer
    ↳ some input restricted to integer

    Betsches I, II

Papers & slides

→ Research gate

- Robust MPC (Safe RL)
  - How to build ground