Optimal Control and Reinforcement Learning

16-745

Spring 2023

Course Team

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Instructor

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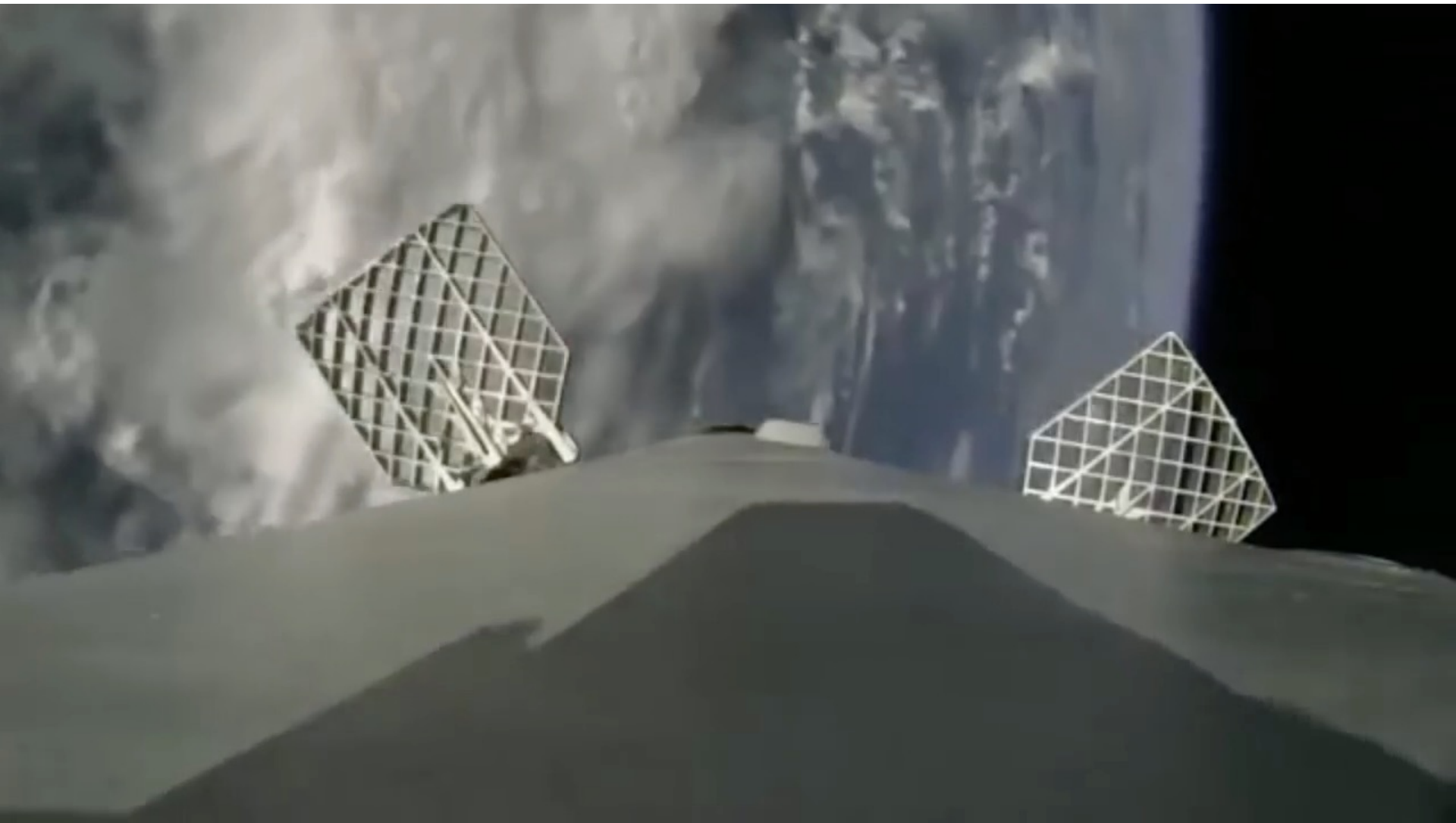TA

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What Is Optimal Control For?

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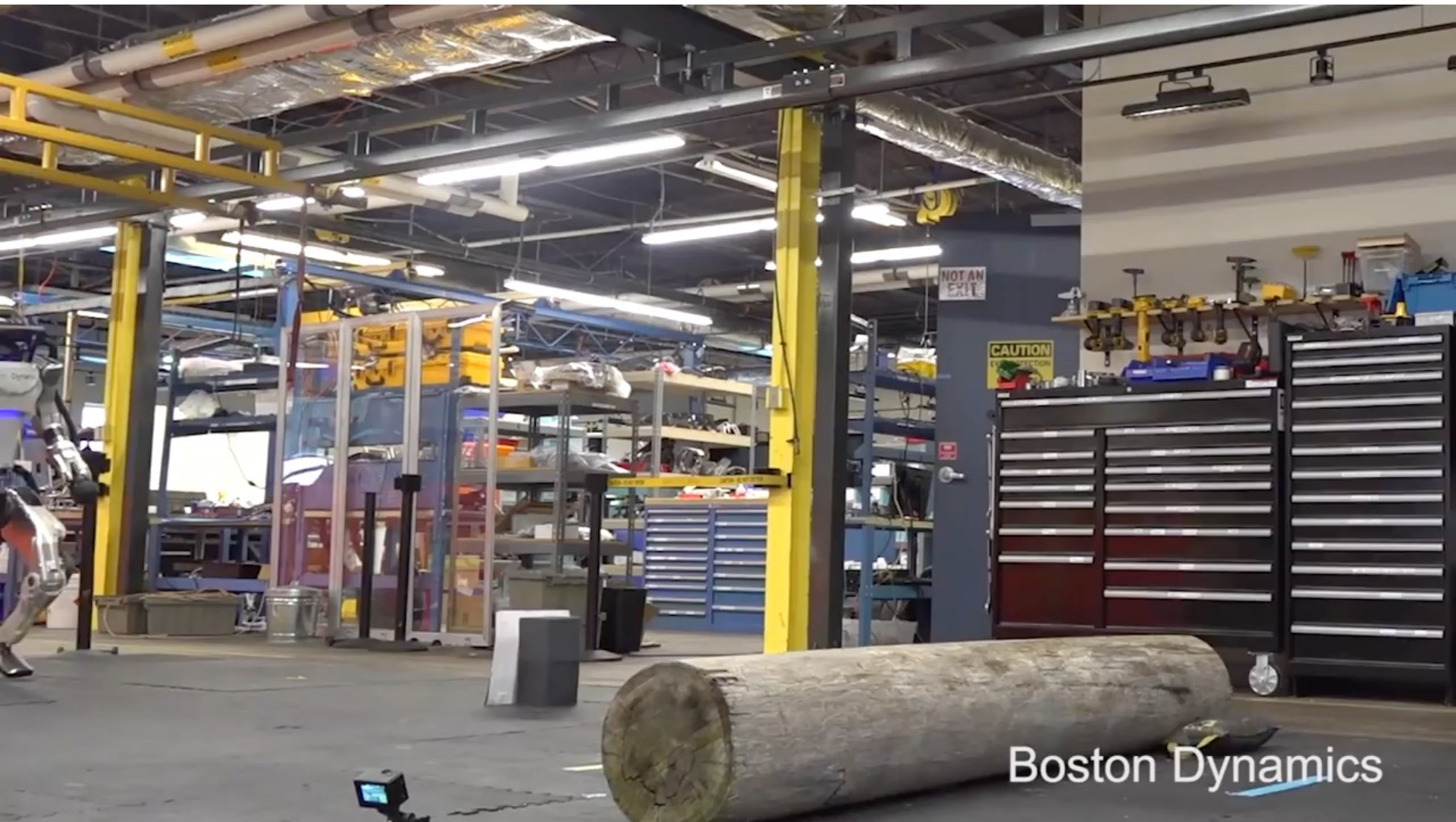# What Is Optimal Control For?

MIT Mini Cheetah
MIT Biomimetic Robotics Laboratory

What Is Optimal Control For?

Boston Dynamics

Current Research Challenges

- Dealing with contact (legged locomotion, manipulation, etc.)

- Bridging the gap between model-based control and RL

- Making RL more data efficient by incorporating prior knowledge

- Safety guarantees for uncertain nonlinear systems

- Dealing with other (possibly adversarial) agents

What Are We Doing Here?

- Optimization-based control techniques

- Focus on robotics applications over theory

- Homeworks (~4) focused on algorithm implementation

- Course project in groups of 1-5 (do something cool!)

Logistics

- Lectures in person + zoom – will be recorded and posted

- Notes from lectures will be posted

- Piazza for course communication

- Homework will be distributed on GitHub and turned in through Gradescope

- Office hours TBD

Getting Started:

Fill out course survey:

https://forms.gle/fYWFXhuMYZMy1GgQ8

Join course Piazza:

https://piazza.com/cmu/spring2023/16745/home