ME 327: Design and Control of Haptic Systems
Spring 2020

Interactive Session 15: Teleoperation: Implementation

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Paper presentation/Hands-on demo

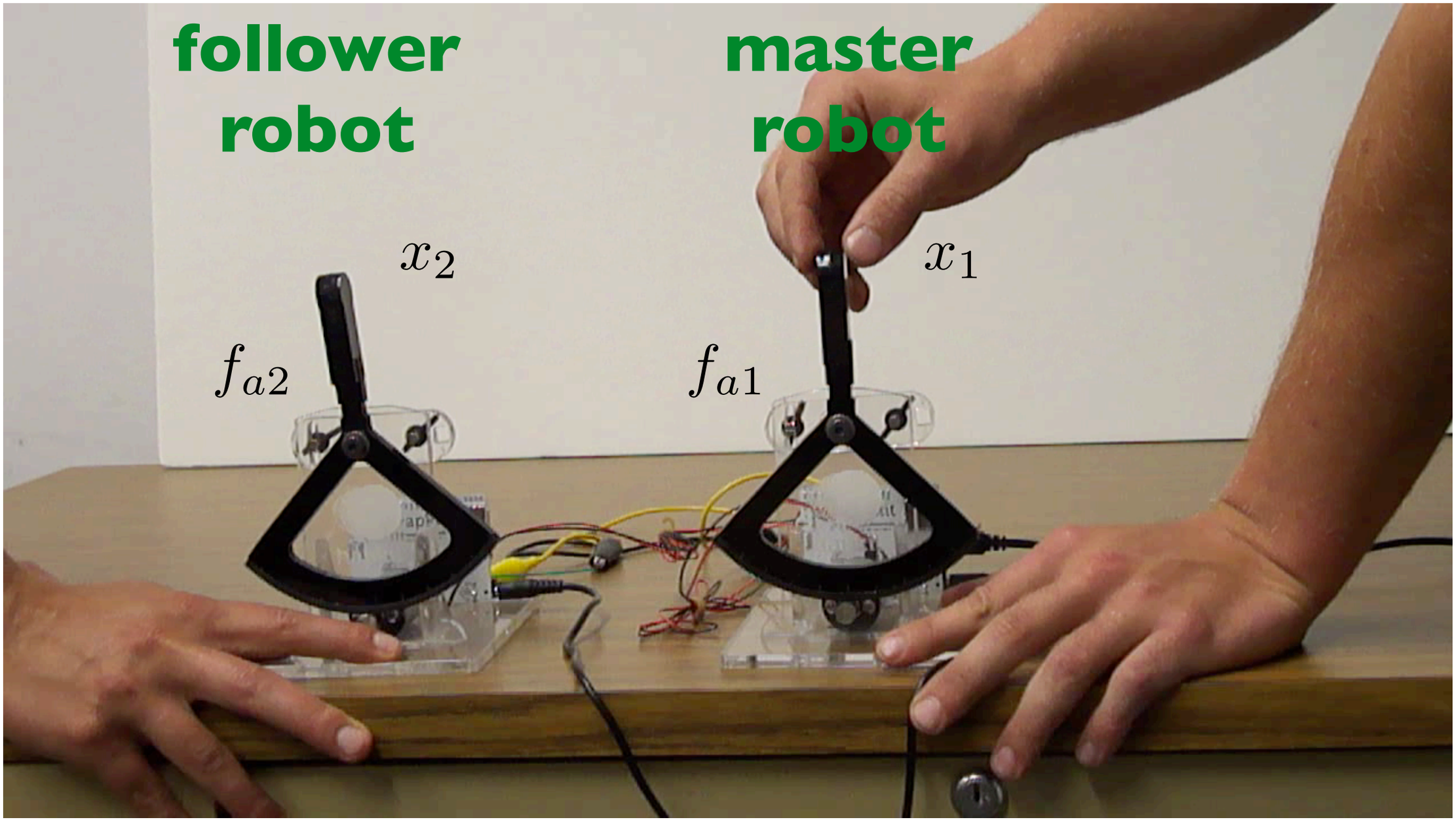
5/28	Choose your team (2-3 people)
5/29	Select a paper
6/2 or 6/4	Show simple hands on demo in class
6/2	Record Presentation (submit URL via Canvas)
6/2	Create quiz questions
6/8	View presentations and take quizzes

Enter team info here:
https://tinyurl.com/ME327-Spring2020-Teams

Join your group/team on Canvas

Questions from prerecorded video?

hapkit example



implementation summary

follower robot controller

$$f_{a2}(t) = k_{p2}(x_1 - x_2) + k_{d2}(\dot{x}_1 - \dot{x}_2)$$

unilateral teleoperation: **master robot controller**

$$f_{a1}(t) = 0$$

bilateral teleoperation (position-exchange):

$$f_{a1}(t) = k_{p1}(x_2 - x_1) + k_{d1}(\dot{x}_2 - \dot{x}_1)$$

bilateral teleoperation (position forward, force feedback):

$$f_{a1}(t) = f_e$$

discussion

- for these control laws to work, what properties should the master and/or follower robot have?
- motion scaling: why would you want this, and how would you change the control laws to accomplish this?
- force amplification: why would you want this, and how would you change the control laws to accomplish this?

discussion

- what might limit the values of the controller gains that you can choose?
- how do these limitations relate to those of force feedback for virtual environments?
- what are the comparative advantages and disadvantages of position- and force-based bilateral teleoperation?

Reminders:

Quiz 2 went well!

Assignment 7 due this Thursday
Assignment 8 will be posted Monday 6/1
(not due until Monday 6/8)

Office Hours/Q&A with Allison until 10 am, if time. Question queue (see tab with today's date):
https://tinyurl.com/HapticsAllison

