

# HAPTIC PONG

## FEEL THE COMPETITION

A PHYSICS - BASED ARCADE GAME  
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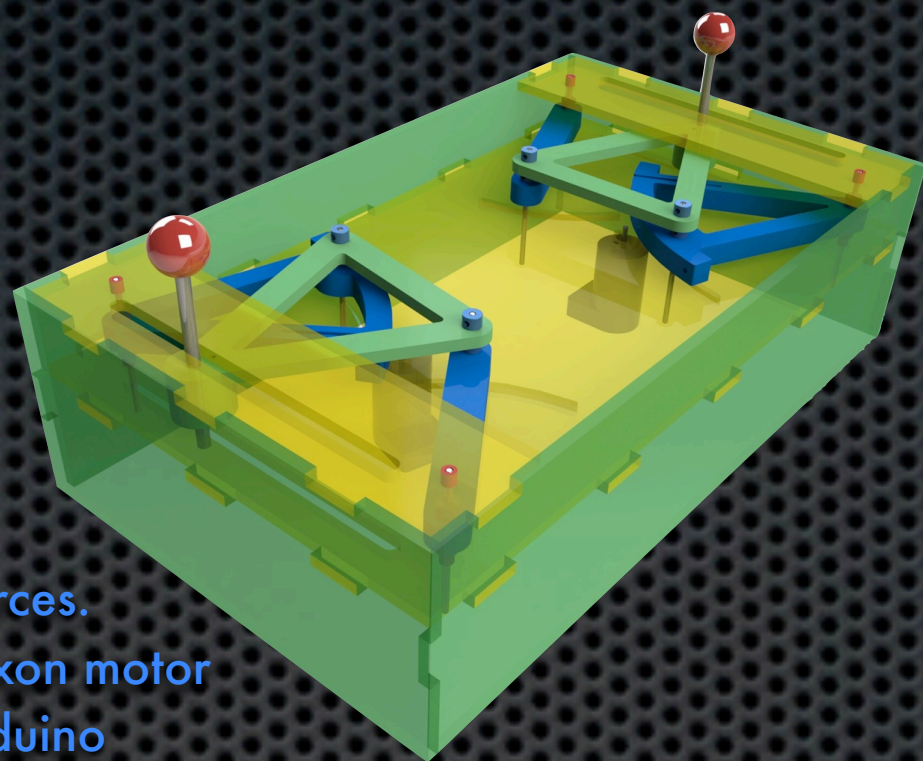
ME327: DESIGN & CONTROL OF HAPTIC SYSTEMS  
STANFORD UNIVERSITY MECHANICAL ENGINEERING

### GOALS:

With the HAPTIC PONG project, our goal was to give students a chance to explore and evaluate a series of force-feedback haptic effects in rapid succession in the most FUN environment possible.

### METHOD:

We built a dual 1-DOF linear system to render forces. Each paddle is driven via capstan drive by a Maxon motor with encoder. Each motor is controlled by an Arduino board talking to the PC over a serial connection. The PC renders graphics and keeps score.



As you play HAPTIC PONG (and watch others play), we encourage you to think about the different haptic effects that the game displays, and see how they affect your performance. Do they help you or hurt you? How do you think they work?

## THE HAPTIC EFFECTS

**AUTO-PILOT:** Let the computer do all of the work for you, as its artificial intelligence tracks the ball's movement! Be ready to take control when this effect ends.

**SPRINGY PADDLE:** Where do you think you are going? This effect makes your paddle hard to move away from the center. Notice how it gets harder to move farther away.

**STICKY FIELD:** With this effect, you will feel like your paddle is stuck in place and will become harder to move. No sudden movements!

**BUMPY FIELD:** The bumps and valleys present in this effect will make you feel like you're moving over tough terrain.

**CLAUSTROPHOBIA:** During this effect you will feel like Luke Skywalker in Star Wars as the walls move in to squish your paddle. Don't worry, it won't last forever.

**FORCE FIELD:** Watch out for the force field, the ball will repel your paddle with its haptic power. Be sure to brace your self and hold on tight!

**PESKY POTHOLE:** You don't want to get stuck with this effect. This moving pothole will trap your paddle and make it hard to get out!