PHYSICAL MATHEMATICS SEMINAR

ON THE PURSUIT OF ROBOTIC LOCOMOTION: EXPERIMENTS WITH LEGGED LOCOMOTION AND FLAPPING-WINGED FLIGHT

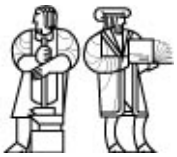
RUSS TEDRAKE
Massachusetts Institute of Technology

ABSTRACT:

The state-of-the-art in robotic locomotion is in (almost) every way inferior to animal locomotion. Controlling the dynamics of a locomoting machine through its complex, and sometimes intermittent, coupling with the environment has proven to be much more difficult than controlling a robotic arm on a factory-room floor. I will present some simple analytical models of the dynamics of legged locomotion, and our controller design process based on optimal control. In the best cases, the control optimization can occur online on a real robot - we have one robot that can "learn" how to walk in just 20 minutes. I will also describe our (working) robotic bird, which we hope will "learn" to catch a ball out of the air and land on a perch. Finally, I will describe our preliminary work in optimizing feedback control systems in more classical fluid experiments. The strong hypothesis of this work is that controlling the interaction between a flapping-wing and a complicated fluid flow might be easier than describing its dynamics.

TUESDAY, MAY 22, 2007
2:30 PM
Building 2, Room 146

Refreshments at 3:30 PM in Building 2, Room 349
(Applied Math Common Room)



Massachusetts Institute of Technology
Department of Mathematics
Cambridge, MA 02139