Meeting: 1001, Evanston, Illinois, SS 15A, Special Session on Mathematical Problems in Robotics

1001-93-52 **Mark W Spong*** (mspong@uiuc.edu), Coordinated Science Lab, 1308 W. Main St., Urbana, IL 61801. *Regulation of Walking Speed in Bipedal Locomotion.* Preliminary report.

We study the problem of bipedal locomotion in the context of passivity based control of nonlinear hybrid dynamical systems. For bipedal robots possessing passive or ballistic limit cycle gaits we have used energy shaping control to remove sensitivity of the limit cycles to variations in ground slope and external disturbances and to increase the basin of attraction of the limit cycles. In this talk we will briefly review these ideas and then show how a PI(Proportional + Integral)control strategy (similar to the cruise control on an automobile) can be designed to modify the closed loop potential energy of the biped in order to regulate forward walking speed to a desired speed. Simulations and animations to illustrate the result will be shown. (Received July 23, 2004)