1135-34-1712 **Yangyang Wang*** (wang.9737@mbi.osu.edu), Jennings Hall 3rd Floor, 1735 Neil Ave., Columbus, OH 43210, and **Jeffery Gill**, **Hillel Chiel** and **Peter Thomas**. *Analysis for piecewise smooth models of a biological motor control system.* Preliminary report.

Motor systems must adapt to perturbations and changing conditions both within and outside the body. We refer to the ability of a system to maintain performance despite perturbations as "robustness". In this work, we explore how sensory feedback could alter a neuromechanical trajectory to enhance robustness for motor control. The underlying mechanism would be to adjust the timing of a particular phase of the trajectory and to vary the path of neuromechanical trajectories. As a concrete example, we focus on a piecewise smooth neuromechanical model of triphasic motor patterns in the feeding apparatus of the marine mollusk, Aplasia californica. To understand the mechanism of the robust sensory feedback control, we generalize variational and phase response analysis developed for stable limit cycle systems to the piecewise smooth neuromechanical system with hard boundary conditions. Based on our analysis, we quantify the robustness of the Aplysia model to the applied perturbation and compare it to the experimental observations. (Received September 24, 2017)