

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Dynamics of a Planar Arm Model with Servo-regulated Viscoelastic Muscles in a Microgravity Environment JARED DURDEN¹, Drury University Society of Physics Students — We constructed a mechanical arm model consisting of a rigid upper arm and forearm which simulates vertical planar arm motion with two degrees of freedom: shoulder rotation and elbow rotation. Computer controlled servo-motors effect rotation of the elbow and shoulder joints through tensions incited in elastic materials which represent muscles. We predicted and then observed vertical planar arm motion in the laboratory under normal Earth gravity conditions, and on NASAs Weightless Wonder in near zero gravity conditions. Because the arm only has two degrees of freedom we were able to simulate near zero gravity in the laboratory and predict the subsequent motion by operating it in the horizontal plane. We will discuss results of the actual observed motion in these three environments, and compare them to the motion predicted based on the equations of motion. We will also discuss how the project was developed physically, mathematically, and electronically.

¹Membership pending

Jared Durden
Drury University Society of Physics Students

Date submitted: 02 Dec 2007

Electronic form version 1.4