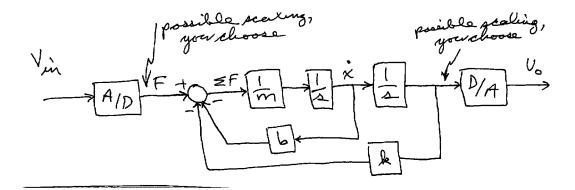## 2.737 Lab 0

Assigned: Sept. 8, 2014
Due: In checkoffs Thurs. Sept. 11, 2014

This lab provides an introduction to using the myRIO with Labview. We will evaluate your work with a brief (5–10 minutes) checkoff on Thurs 9/11. No written lab report or other documentation is required.

Specifically, we ask you to:

1. Run the supplied Labview VI which emulates a first-order continuous time filter, as driven by an input on an A/D channel, and which outputs on a D/A channel. Examine the input and output on the front panel displays in Labview and on the bench oscilloscopes in the lab. Explore the effects of sampling visible in the signals on the oscilloscope. Try different sample rates of the myRIO simulation loop. What interesting effects can you observe?

2. Now modify the supplied VI to simulate a second-order mass-spring-damper system in state variable form as shown below.

   Note that your simulation should use individual integrators which store the velocity and position states. Program the front panel of the VI to allow you to adjust m, b, and k. Simulate this second-order system for some "interesting" values of these parameters. What effects can you see from the discrete-time implementation? Try varying the sample rate of the simulation loop. What effects can you observe?

Checkoff on Thursday 9/11: We will post a signup sheet for checkoffs. You will need to demonstrate your working myRIO and associated signals on the oscilloscope for both models. Also plan to show us any interesting effects you have observed.

2.737 Mechatronics
Fall 2014