PI_tester.m - Verfiy Real PI Controller Results

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This script runs a simulation of a motor with bearing friction and plots the results

Author: Josiah Smith (jsmith2@mines.edu) required file: PI_verification.slx

Initialize simulation parameters

Find transfer function approximation parameters from motor_function.m Find K from motor's averaged final value

```
K = 13.45;
% Find sigma from motor model rise time, determined manually from CSV
% plots.
rise_time = 1.17 - 1.01;
sigma = 2.2 / rise_time;
```
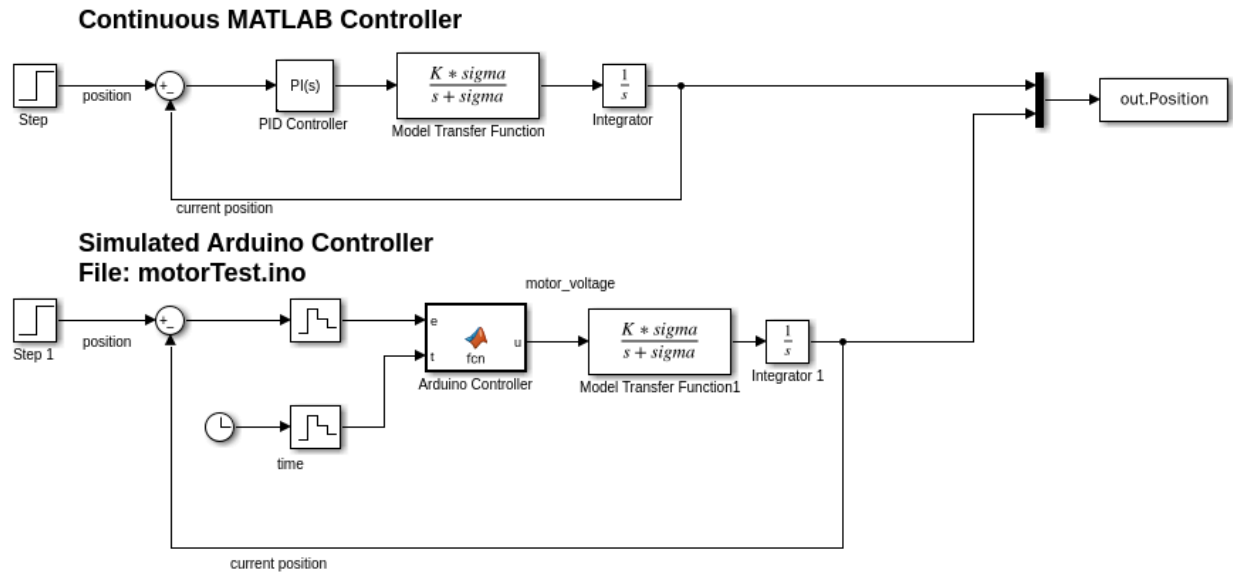
Run a Simulation

Simulate ideal PID controller results vs discrete controller designed for Arduino

```
model = 'PI_verification';

info = 'Simulating model: ';
disp(append(info, model))

open_system(model)
%
% run the simulation
%
out=sim(model);

Simulating model: PI_verification
```

Continuous MATLAB Controller

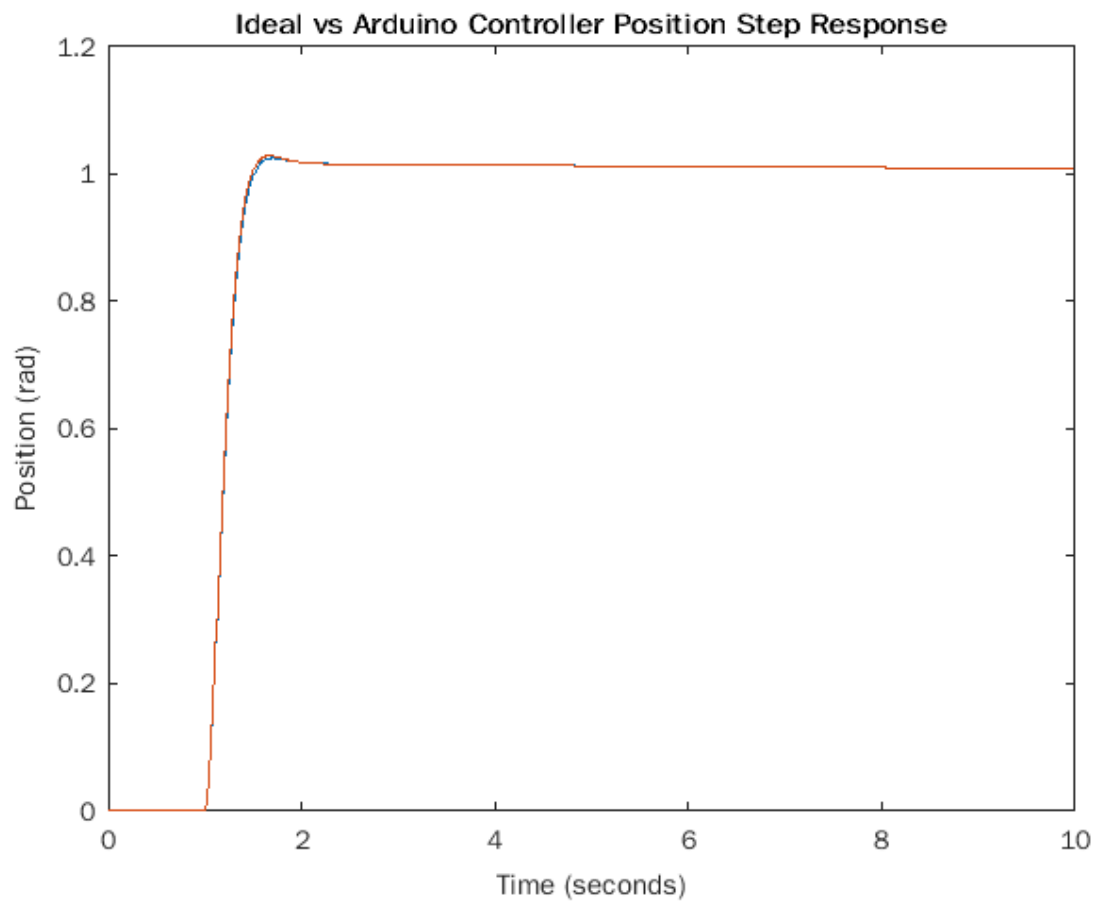**Simulated Arduino Controller
File: motorTest.ino**

A Plot of the results

Plot controller step response of both ideal and discrete controllers.

```
figure
plot(out.Position);
title('Ideal vs Arduino Controller Position Step Response');
```

```
xlabel('Time (seconds)');
ylabel('Position (rad)');
```

Ideal vs Arduino Controller Position Step Response

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