

# Motor Control Lab 04: Discrete-Time Domain Controller Design

## 1 Introduction

In this lab assignment, you will implement your discrete-time controller for the inertia mode, and then compare to the indirectly designed controller you implemented in the previous lab assignment. Specifically, you will need to

1. Design and implement a controller in discrete-time domain ( $T_s = 0.1$  sec).
2. Compare to continuous-time domain design in both experimental and simulation results.

## 2 Specification

Same as in lab #03, you should design and implement a controller for the inertia mode (with position output  $y$ ; unit in rad.) in discrete-time  $z$ -domain with the following specifications:

1. Sampling time  $T_s = 0.1$  sec
2. Rising time  $\leq 0.3$  sec
3. Maximal overshoot  $\leq 15\%$
4. No control saturation when the input step size  $\leq 5$  rad.

(hint: use sisotool to design a lead compensator)

## 3 Checklist

1. Perform closed-loop step response with the step size equals 5 rad., and then compare to the simulation result.
2. Compare to the experimental data ( $T_s = 0.1$ ) you collected in the previous lab assignment.