Pre-lab 6

1. The purpose of this lab to utlisize learnings from Lab 1-5 to implement a state space integral controls algorithm to perform position control – we not only get introduced to the time delays involved in each step, but also learn how to carry out a more synchronized and time efficient ISR model where next read and write current commands occur together, and then use a single computation time, as opposed to reading, processing, and then writing which involves more delays. In this lab we will first derive and implement open-loop excitation, and next actually program it onto the TI launchpad to simulate a potential implementation of a robotic pic and place machine to assemble PCBs.
2. From the given code:
   (a) R = 7.5 ohm, K = 0.16 A, F = 1.9 * 10^{-4}
   (b) When I change the multiplier value for jhat to 2, the peak current values went to -2 and 2. Moreover, a transient was introduced in all of the waveforms.
   (c) When I changed **lambda_r** to 100, from 50, all the waveforms were distorted, oscillations of an underdamped system were introduced. When I changed **lamba_e** to have a multiplier of 100, the entire signal was distorted and represented nothing like the waveform.
   (d) When I changed T to a multiple of 5, several disturbances (peaks and troughs) where introduced on each major peak and trough of the signal.
   (e) The entire waveform changes – several new peaks/troughs are introduced – the theta plot changes to some form of triangular function.
   (f) Steady state error E(t) = X(t) – Xhat(t) = 0