Lab Section: TPM

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**Lab 2 – Characterization of The Flywheel Plant**

**Experiment #2. Derive angular velocity**

*wheel\_vel = (wheel\_pos-pre\_wheel\_pos)/loop\_time;*

**Experiment #3. Low-pass filter**

*filt\_vel = alpha\*wheel\_vel + (1-alpha)\*filt\_vel;*

*Determine the value of alpha if the sampling period is 0.01s and the desired filter cutoff frequency is 15Hz.*

*0.01/(0.01+1/(15\*2\*pi)) = 0.4851936*

**Experiment #4. Open-loop transfer function**

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Open-loop transfer function (input: PWM pin voltage, output: wheel angular velocity):

Tau = 0.15s

Vss = 25.8

Vin = 2.94

Kdc = 8.7755102

8.7755102/(0.15s+1)

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**Extra Credit Task: Simscape Simulation**



0.0075 V

3.2 ohms

0.00096 N\*m