Lab #2 Modeling the Servomotor – a Detailed Marking Scheme

	Target Expectation 2.5 out of 3	Threshold Expectation 1.5 out of 3	
General Presentation:	The report was methodical, with clear communication of thought in a logical progression. Illustrative figures are thoughtful, and appropriately referenced.	The report was difficult to read due to poor communication of thought and/or superficial treatment of the required elements. Either too many unreferenced figures, or not enough, or not appropriate for illustration of point.	**Grade out of 3**
Transfer Function Modelling: Include a brief description of the procedure and calculations done to obtain the motor second order and reduced models, and computations for encoder and tachometer gains.	Concise mathematical development of how a servomotor works, how the model and reduced order model are obtained, and how the encoder and tachometer gains are derived in order to obtain the motor position and speed.	Unclear as to how the motor transfer function(s) are obtained and/or how to interpret the simplifying assumption for a low order model and/or how to obtain correct position and speed signals from the encoder and tachometer, although correct values were obtained.	**Grade out of 3**
Dead Band Adjustment: Include a brief definition of dead band, calculations done for the dead band with illustrative plot showing measurements, and description of any further adjustments done based on comparisons with angle data. Provide a table with initial computations of, and final adjusted values of, dead band d_1, d_2 parameters.	Dead band data correctly measured from the open loop servomotor speed response, and dead band correctly computed based on the measurements. Adjustments to dead band clearly documented.	Unclear as to how the dead band was computed, although a non-zero dead band was obtained that seems appropriate for the measurements done.	**Grade out of 3**

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Model Performance – Triangle Wave: Plot of the speed and angle responses to the triangle waveforms showing **the final adjusted model** response, superimposed with the measured **real servomotor response.** No more than 2-3 cycles visible, frequency low enough to see the steady state reached in each cycle.	Clear explanation of the tests performed, and quantitative analysis of the fit between the model and the data. Discussion of causes for discrepancies.	Lack of understanding about the reason for model adjustment, and/or unclear in explanation of what these tests were for. Superficial/qualitative analysis of the adjusted model.	**Grade out of 3**
Model Performance – Square Wave: Plot of the speed responses to the square wave inputs, no more than 2-3 cycles visible, frequency low enough to see the steady state reached in each cycle. The plot must show **the final adjusted model** response compared with **the actual servo response**, labeled so that which is which can be easily identified. Make sure the controller is operating in the +/- 10 volt armature voltage range, i.e., the armature voltage is not saturating.	Clear explanation of the tests performed, and quantitative analysis of the fit between the model and the data. Discussion of causes for discrepancies	Lack of understanding about the reason for model adjustment, and/or unclear in explanation of what these tests were for. Superficial analysis of the adjusted model.	**Grade out of 3**
		Total Grade out of 15	