ECE311

Design Project: Part 2a

Aim: This is a continuation of the project where we take the first steps in closed loop design using an integral controller. The response to a step input will be examined at both circuit and transfer function levels.

Tasks:

1) The closed loop configurations for both the PECS and Simulink simulators have been discussed in class where an integral compensator was used. This compensator has the transfer function: $G_C(s) = \frac{K}{s}$, where *K* is a constant to be determined next.
2) Based on the modelling done for the closed loop system with the integral compensator derive the input reference voltage to output voltage transfer function.
3) Using Routh-Hurwitz determine a range for parameter *K* for which the closed loop system is stable.
4) Select a value in this range and simulate the step response of this closed loop system as was undertaken in Part 1 of the project.
5) The deliverables for this part of the project is the same as for Part 1, which are repeated below.

Deliverables

For both simulators show the schematics used and the responses obtained. Also show the script file used with Simulink which is run to set the parameters of the Simulink model.

Determine the following three quantities from the step response:

1) Rise time
2) Overshoot (%)
3) Settling-time (5% bounds)

Show these together in a table for both the PECS and Simulink responses. Comment on the results, i.e. how similar are they?

Provide a short description for what you are showing for all the figures.