EE 362K
Homework 6 Rubric

Q1

- State space model for system
- T(s) via state space model
- T(s) via Laplace transform

Q2

(a)

- Steps to obtain y(t)
- Steady state value

(b)

- State space model via MATLAB
- Eigenvalues of A
- Poles of transfer function

(c)

- Formula to obtain T(s) from convolution equation and subsequently
- T(s) computed via above formula (by hand or MATLAB)

Q3

- Simplification of block diagram with steps clearly shown

Q4

For (a) and (b), find the required transfer function. For (c), show steps to find $\frac{Y(s)}{R(s)}$. You can use the results of (a) and (b) with justification.

Q5

For each part,

- Expression of real part in terms of ω
- Expression of imaginary part in terms of ω
- Polar plot
- Bode plots

Q6

- All the required steps (as covered in lecture) have to be shown. Steps that are not required for this case may be skipped without justification.
- Sketch of root locus
- Root locus found via MATLAB
- Identify gain, k, **just before break-away and just after break-in**
- Sketches of Bode plots for above gains
- MATLAB Bode plots for above gains

Q7

Specify the values of k used and simulate step responses

Q8

- Justification for why it is (not) possible to add a pole in the **left half plane** to ensure the system becomes unstable as $k \to \infty$
- Plot to support your argument - root locus or step response

Q9

- Identify poles and zeros with justification
- Compute DC gain
- Expression for $T(s)$