ROBUST CONTROL

Exercise 2 – Controllability of SISO Systems, Uncertainty and Robustness

1. Given the system $G(s) = (s - 1)/(s + 1)^2$, we want to design a feedback controller so that $\|w_p S\|_\infty < 1$ with the weight $w_P = (0.5s + 1)/s$. Is this possible?
2. Describe the following system:

$$G(s) = \frac{2(s + z)}{(8s + 1)}, \qquad z \in [1,2]$$

in the multiplicative uncertainty form by:

   a. using multiple values of z and estimating the upper bound of the relative uncertainty,

   b. analytically,

   c. extract sufficient conditions for robust stability and comment on the conservativeness.