Pole-placement — To be done before Lecture Nov 7

1. Consider the following linearized model for vehicle steering. The transfer function from steering angle to lateral position is

$$P(s) = \frac{0.5s+1}{s^2}.$$

Design a continuous controller based on state feedback and an observer. Let the poles associated with state feedback be characterized by $\omega_c = 10$, $\zeta_c = 0.707$ and those of the observer by $\omega_o = 20$ and $\zeta_o = 0.707$. Plot the Nyquist curve of the closed loops system, determine the stability margins and the maximum sensitivities.