

Final

I. Solve problem 14.9, p. 301 from Zhou.

II. Consider Examples #4, #5 and #6 in the lecture notes, chapter 7. Let

$$\bar{m} = \bar{k} = \bar{c} = 1.$$

(a) Let $f = 0$ and find all values of $\bar{\delta}_m$, $\bar{\delta}_k$, $\bar{\delta}_c$ (as in Example #5) for which the mass/spring/damper system is stable.

(b) Let $f = 0$ and solve the following problem for each example:

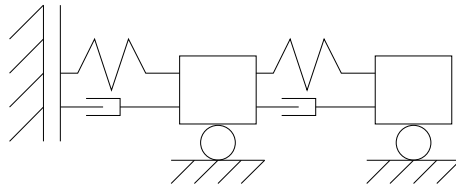
$$\min_{\gamma} \{ \gamma : \|H(s)\| < \gamma \}$$

Compare the answer with item (a).

(c) Let $y = \dot{x}$, $u = f$ and solve the following robust control problem for each example:

$$\min_{\gamma, C(s)} \{ \gamma : \|\mathcal{F}_l(H(s), C(s))\| < \gamma \}$$

(d) Add one additional mass connected by a spring/damper with same coefficients as in the figure below. Let all masses, stiffness and damping be uncertain parameters and derive a structured uncertainty model for the resulting two mass system.



(e) * Solve problem in item (c) for the system in item (d).