

University of Wisconsin-Madison
Department of Electrical and Computer Engineering
ECE 332 - Feedback Control Systems, Fall Semester 1998
Problem Set #5

Distributed: Friday, October 2

Due: Friday, October 9

Reading: These problems will make use of material in Dorf, Chapter 5, through 5.7.

Reminder: First exam, Tuesday, October 13, 7:15-9:15 pm. Room TBA.

Dorf, Chapter 5, **Exercises**

E5.8

E5.9 Remember that n and m of the closed loop denominator determine the closed loop pole locations.

Dorf, Chapter 5, **Problems**

P5.1 Note that the input and output signals (v_c and v_b) are in units of degrees/second. In (b), the steady state error to be computed is with respect to a step input of the maximum expected magnitude (which Dorf states is 25 degrees/second).

P5.16 The sensitivity to be computed is that of the closed loop transfer function (actual heart rate/desired heart rate) with respect to K . Part (d) is somewhat ambiguous. To make the problem specific, and give you some practice with transfer function (or sensitivity function) magnitude evaluation, assume the 60 beats per minute may be treated as a sinusoidal signal. Therefore evaluate the magnitude of the sensitivity function at $s = j\omega$, with ω in radians/sec corresponding to 60 cycles/sec.

Dorf, Chapter 5, **Advanced Problems**

AP5.4