

EE 554 – Homework Chapter 6

6.7 Design a digital filter by applying the bilinear transformation to the analog (Butterworth) filter

$$Ca(s) = \frac{1}{s^2 + \sqrt{2}s + 1}$$

With $T = 0.1s$. Then apply prewarping at the 3-dB frequency.

6.13 Design a deadbeat controller for the system of Problem 5.7 to obtain perfect tracking of a unit step in minimum finite time. Obtain the analog output for the system, and compare your design to that obtained in Problem 5.7. Then apply the controller to the process

$$G(s) = \frac{1}{(s + 1)(s + 5)(0.1s + 1)}$$