lec 8

Ex. 1

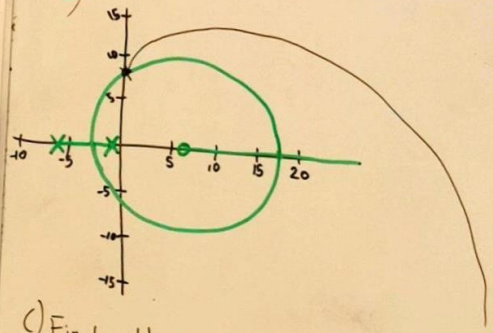
A) Simple unity feedback system has a time delay of 0.3s

$$G(s) = \frac{Ke^{-0.3s}}{s+1}$$

Approx with Padé: $e^{-\tau s} \approx \frac{1-\frac{\tau s}{2}}{1+\frac{\tau s}{2}} = \frac{1-0.15s}{1+0.15s}$

$$G(s) = \frac{K\cdot\left(\frac{1-0.15s}{1+0.15s}\right)}{s+1} = \frac{K\cdot(1-0.15s)}{(s+1)(1+0.15s)}$$

B)



C) Find the limit of K giving stability

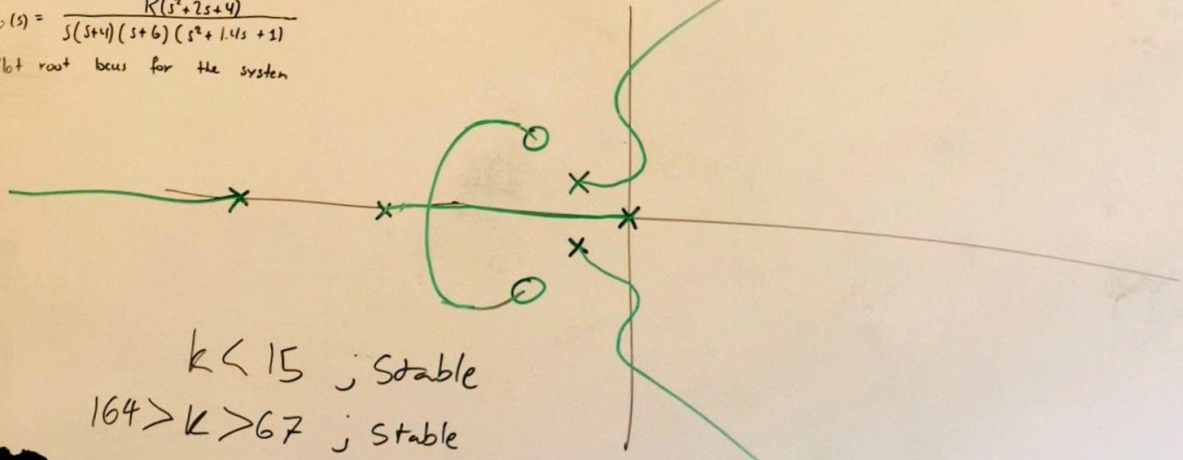
= 782

Ex 2

In a unity feedback system

$$G(s) = \frac{K(s^2+2s+4)}{s(s+4)(s+6)(s^2+1.4s+1)}$$

Plot root locus for the system



$k < 15$; Stable

$164 > K > 67$; Stable