

Lecture 6

Time delay: Transport delay $T_d = 5$
 Second order tf $G(s) = \frac{20}{(s+2)(s+10)}$

Design a control system with PM 45°

a) Without smith prediction \rightarrow Plot matlab P-control

$$-135^\circ \rightarrow 0.2 \text{ dB} \quad 20 \log_{10}(K) = 0.2 \text{ dB} \rightarrow \text{ca } 1$$

b) with smith prediction

Plot $G(s)$ matlab

$$-135^\circ \rightarrow -21.2 \text{ dB} \quad 11.48$$

Put into system function

$$\frac{K G(s) \cdot e^{-sT}}{1 + K \cdot G(s)}$$

Plot step response

