Lecture 3

b - $D(s) = K\left(1 + \frac{1}{T_i s}\right)$

2) Design T_i in the PI so one pole in -0.1 is cancelled

$$\text{Open loop} = \frac{0.1}{(s+0.1)^2(s+10)} \cdot K\left(\frac{T_i s + 1}{T_i s}\right) = \frac{(T_i s + 1)\cdot 0.1}{(s+0.1)^2(s+10)(T_i s)} \cdot K$$

$T_i = 10$

$$\text{open loop: } K\frac{(10s+1)\cdot 0.1}{(s+0.1)^2(s+10)\cdot 10s} = K\frac{0.1}{(s+0.1)(s+10)\cdot s}$$

(One pole in -0.1 is cancelled)

3) Design K for $\approx 45°$ PM

Tegn bodeplot i matLab

K mangler -3dB ved -135° fase

$3dB = 20\log(K) = 1.4$

The PI is then $1.4 \cdot \frac{s+0.1}{s}$