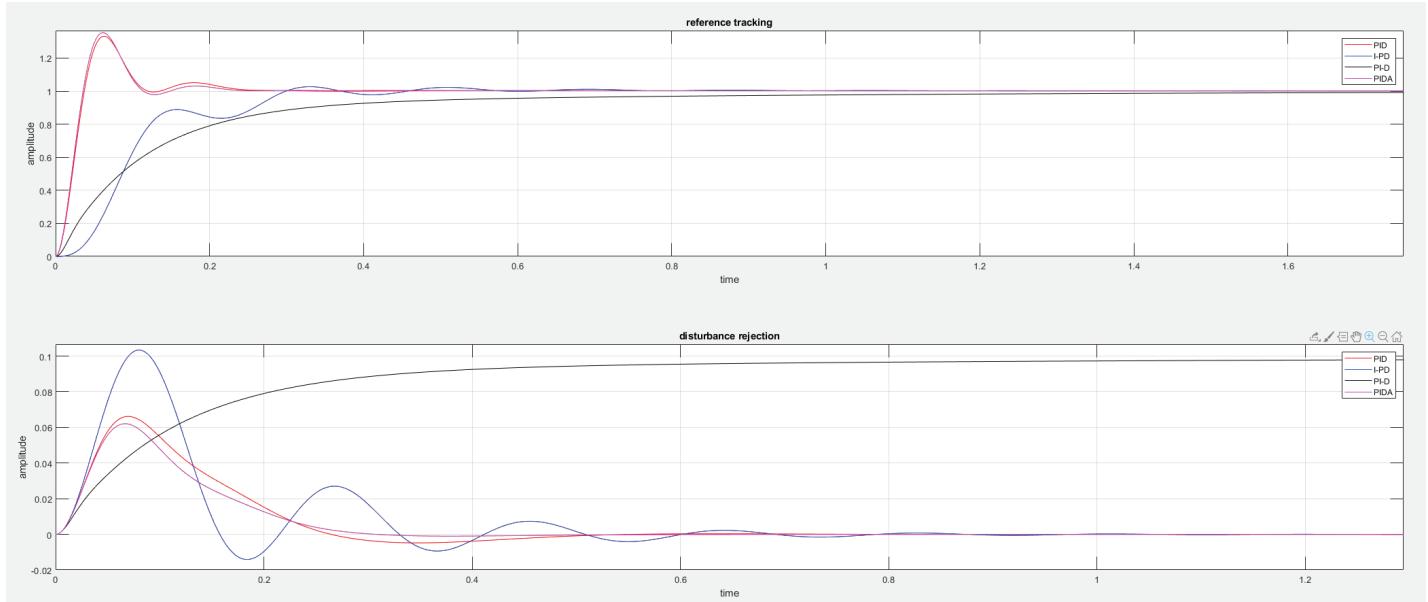


Fast and slow modes

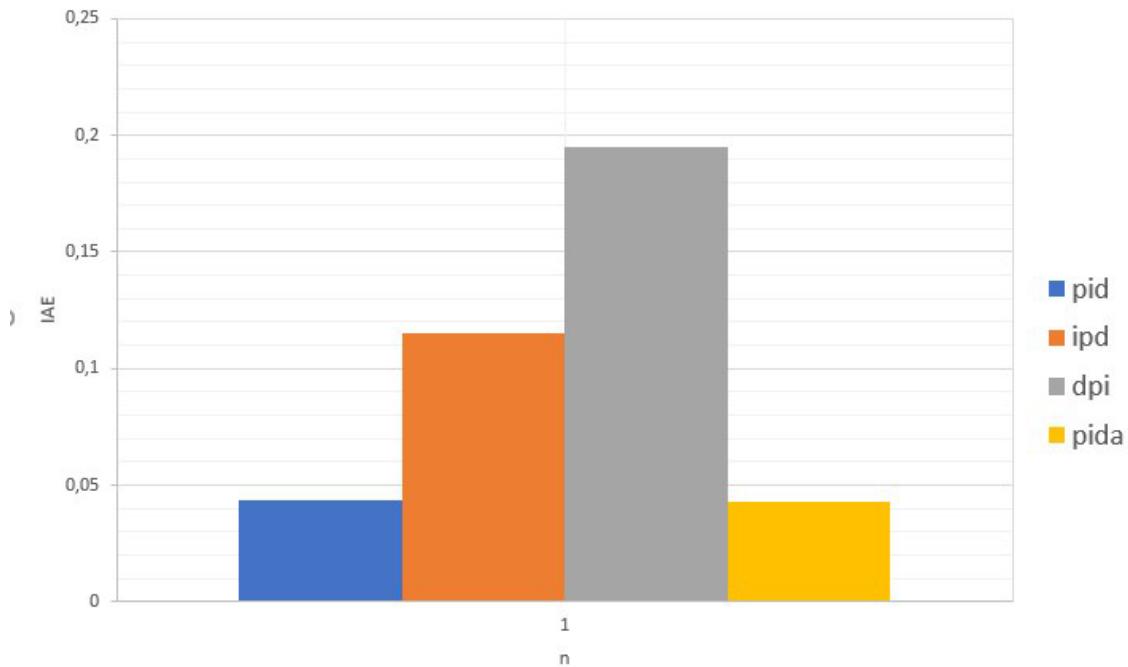
$$G(s) = \frac{100}{(s+10)^2} \left(\frac{1}{s+1} + \frac{0.5}{s+0.05} \right)$$

n=1



Trend IAE

fast and slow modes

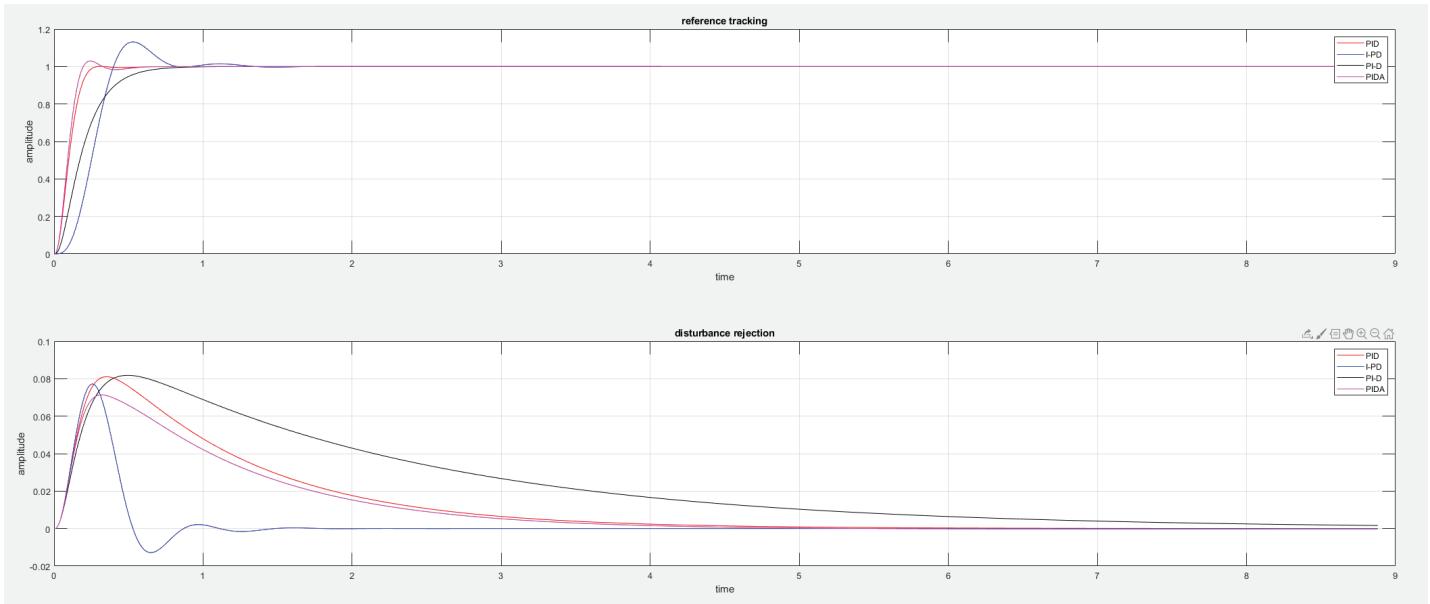


Fourth Order System

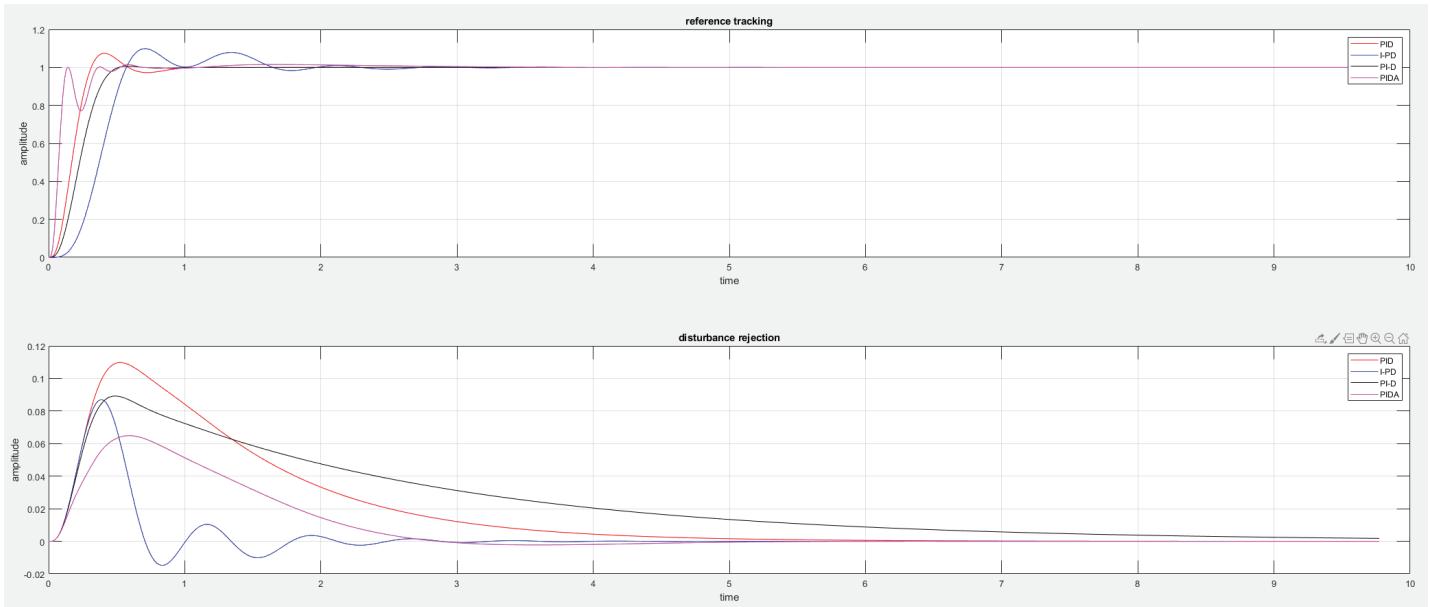
$$G(s) = \frac{1}{(s+1)(1+\alpha s)(1+\alpha^2 s)(1+\alpha^3 s)}$$

$$\alpha = 0.1, 0.2, 0.5, 1.0$$

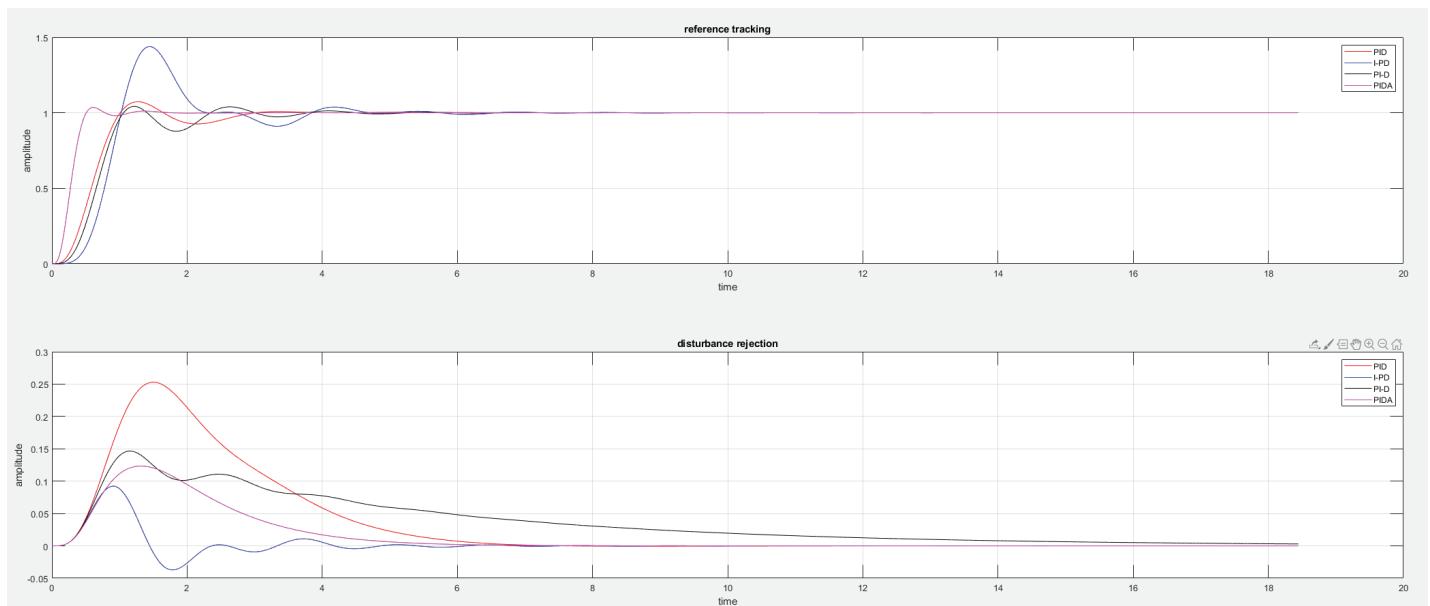
$n=0,1$



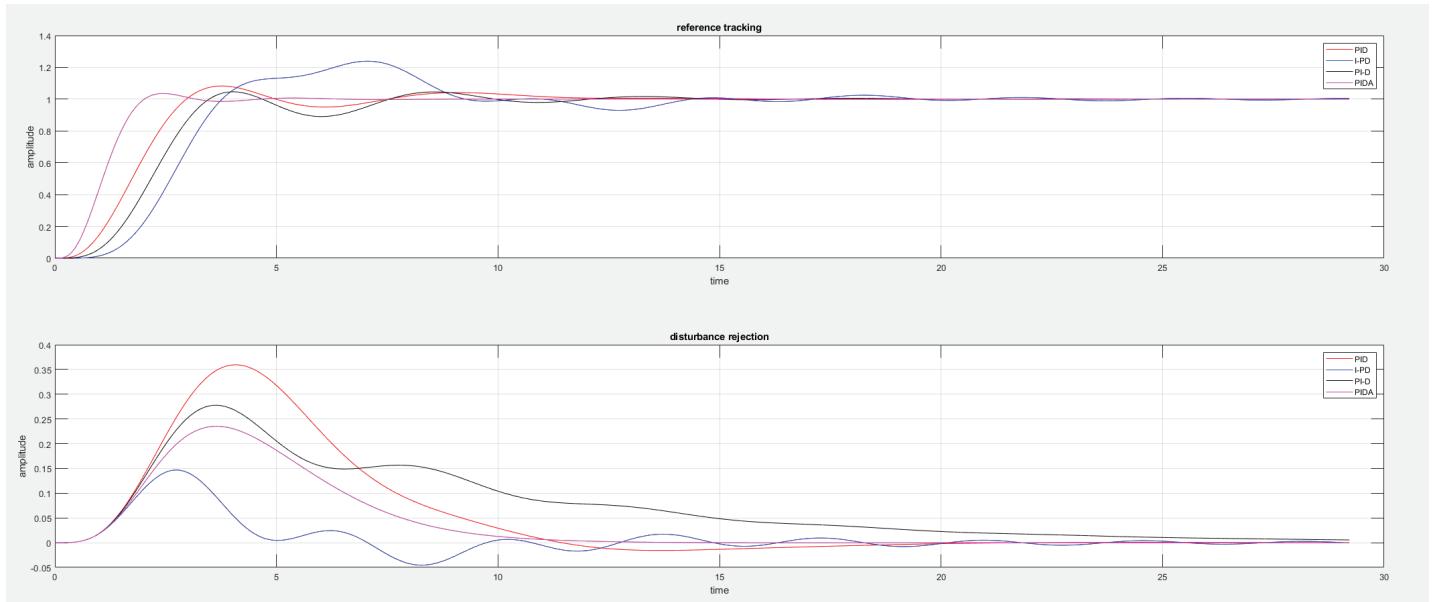
$n=0,2$



$n=0,5$

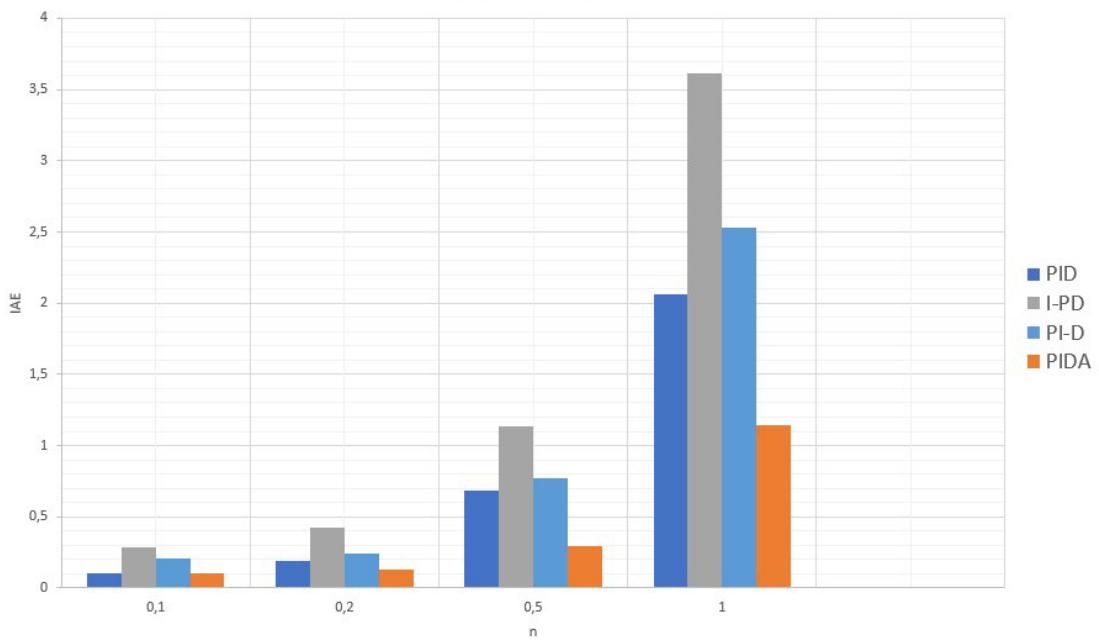


n=1



Trend IAE

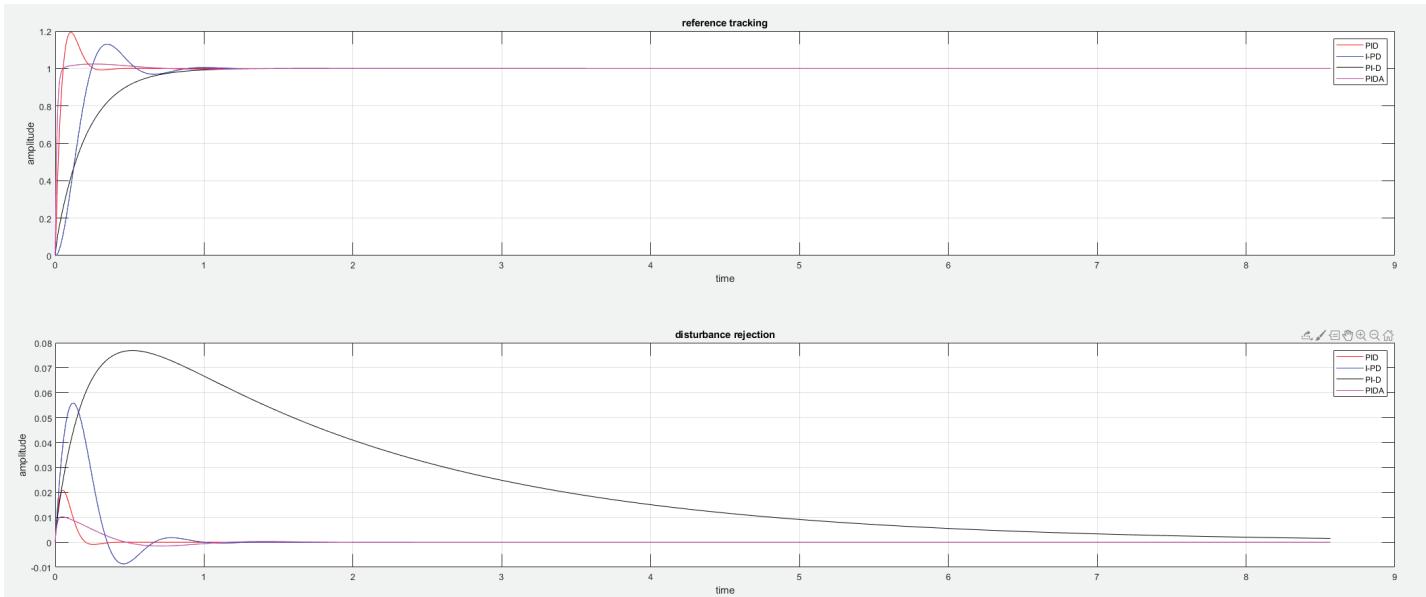
fourth order system



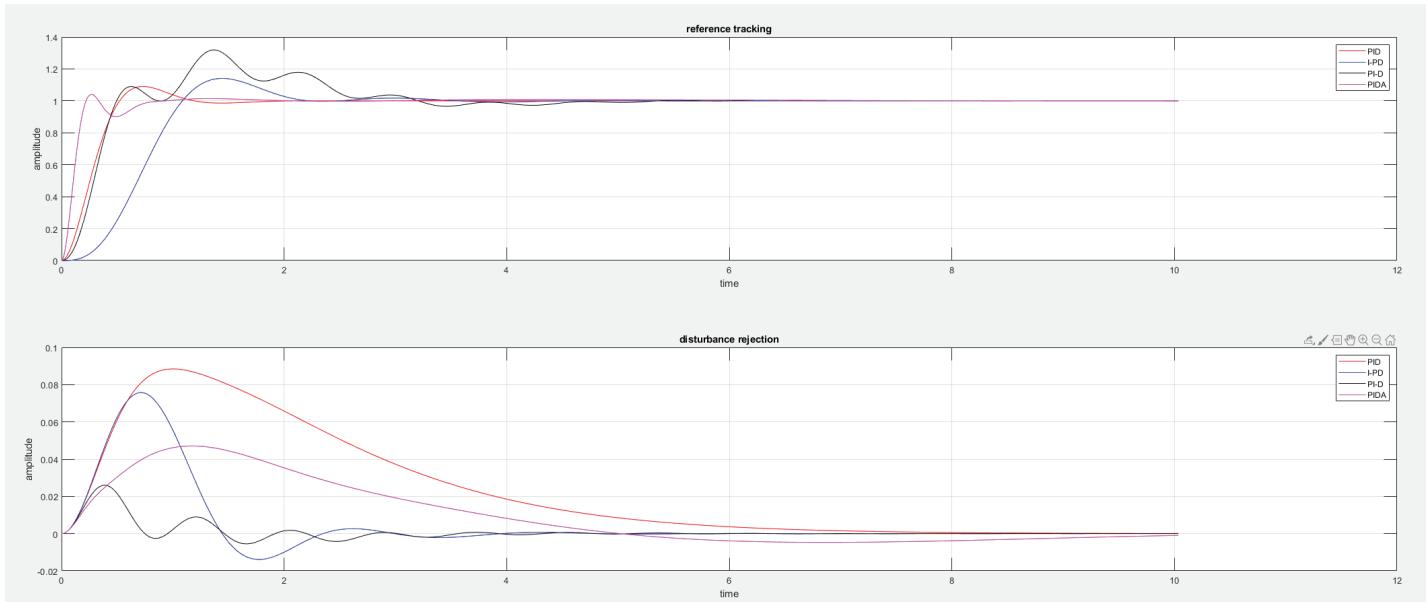
Multiple Equal Poles

$$G(s) = \frac{1}{(s + 1)^n}$$

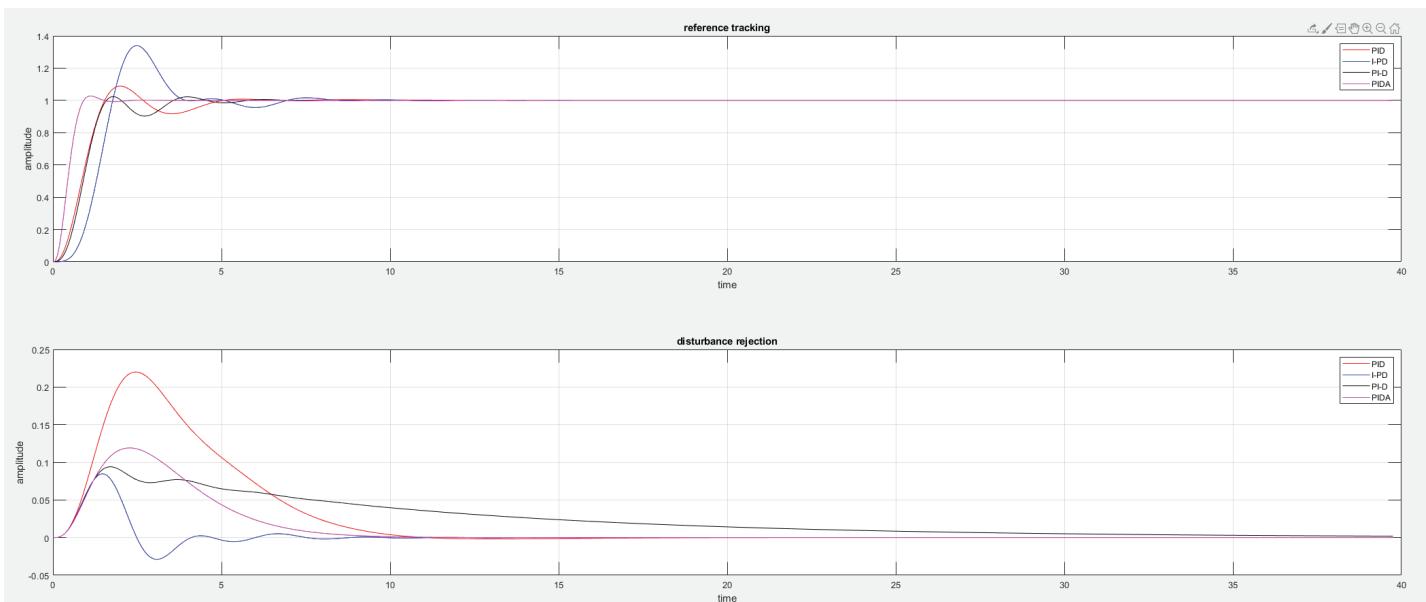
$n=1$



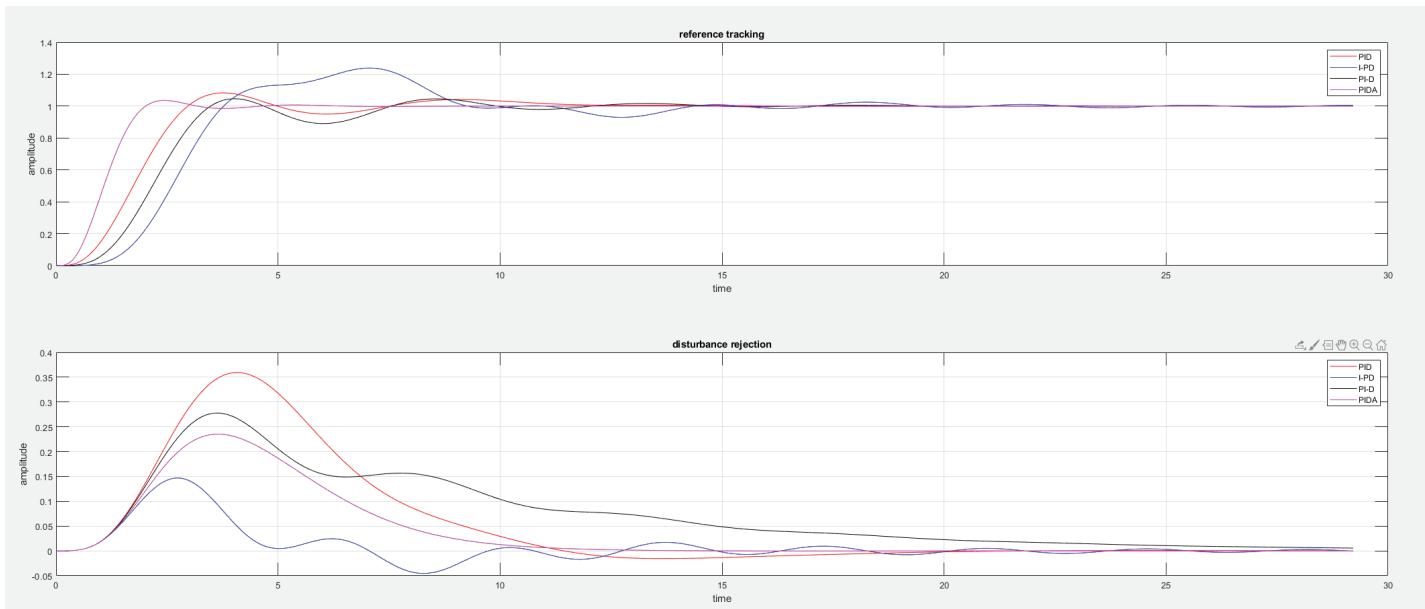
$n=2$



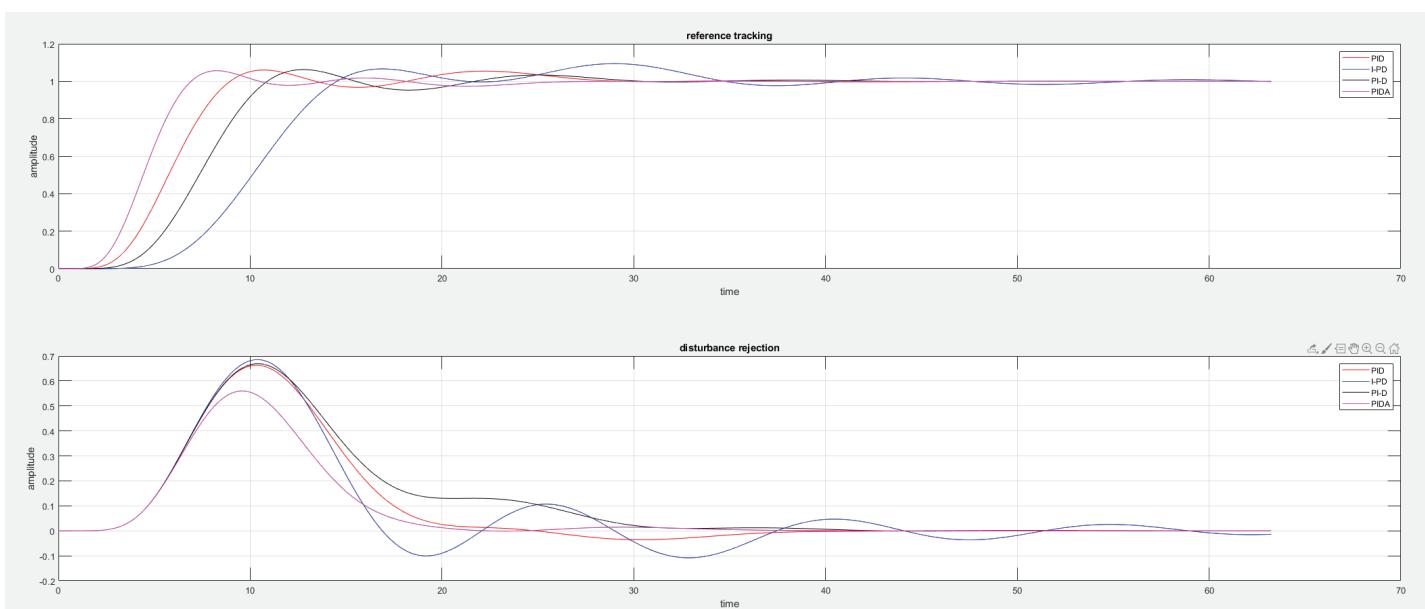
$n=3$



n=4

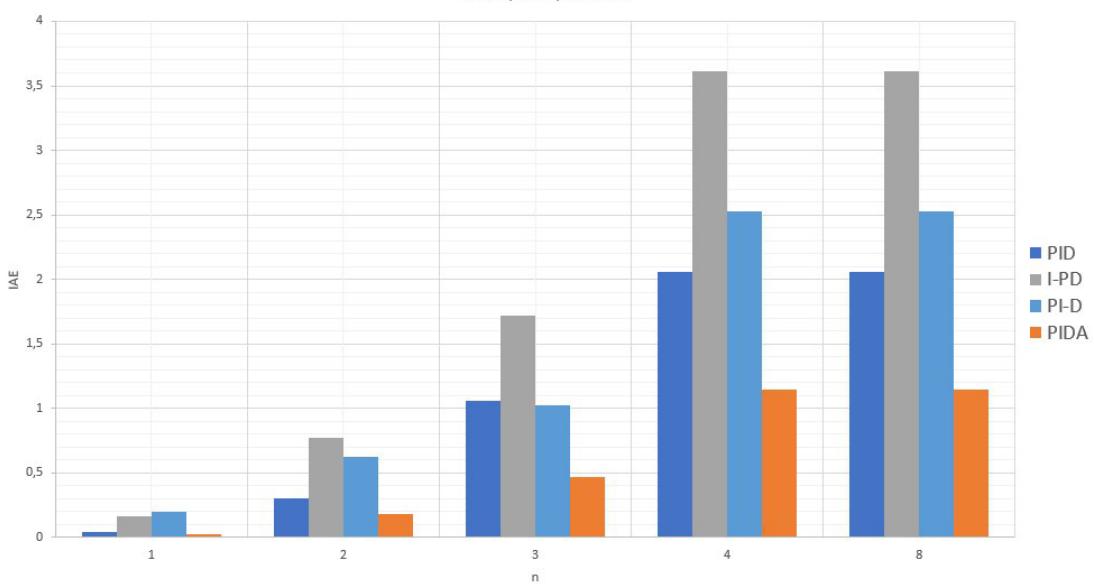


n=8



Trend IAE

Multiple Equal Poles

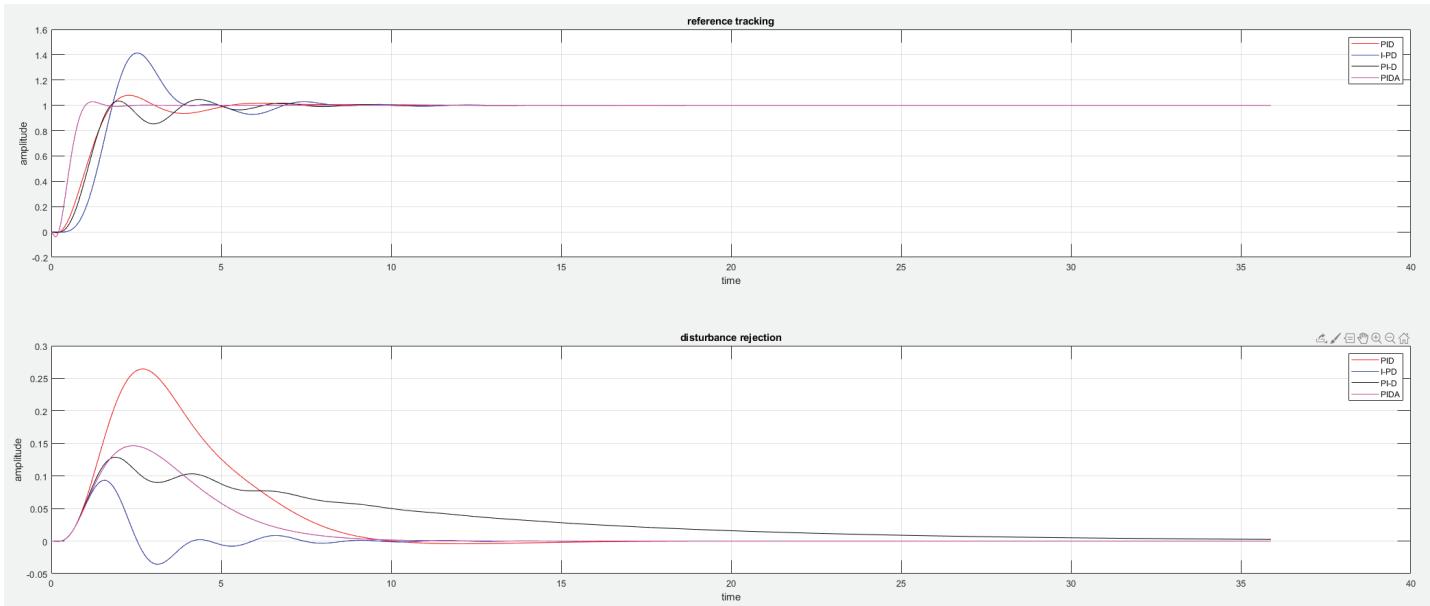


Right Half Plane Zero

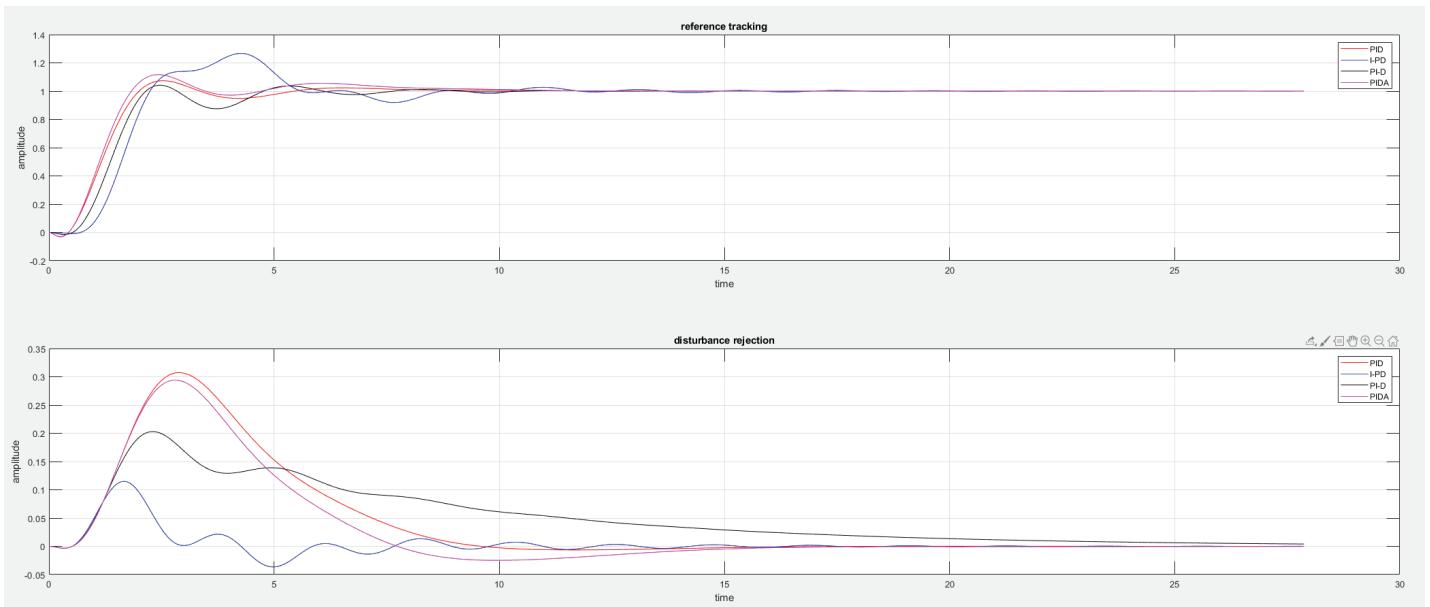
$$G(s) = \frac{1 - \alpha s}{(s + 1)^3}$$

$\alpha = 0.1, 0.2, 0.5, 1, 2, 5$

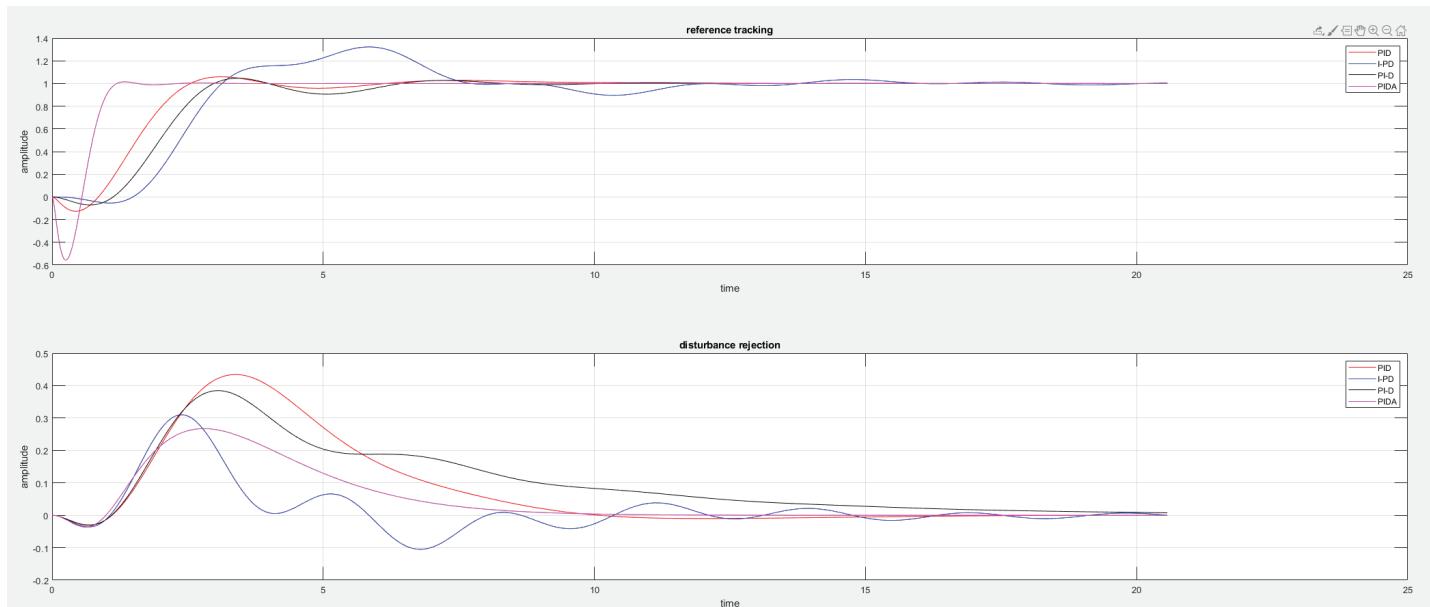
n=0,1



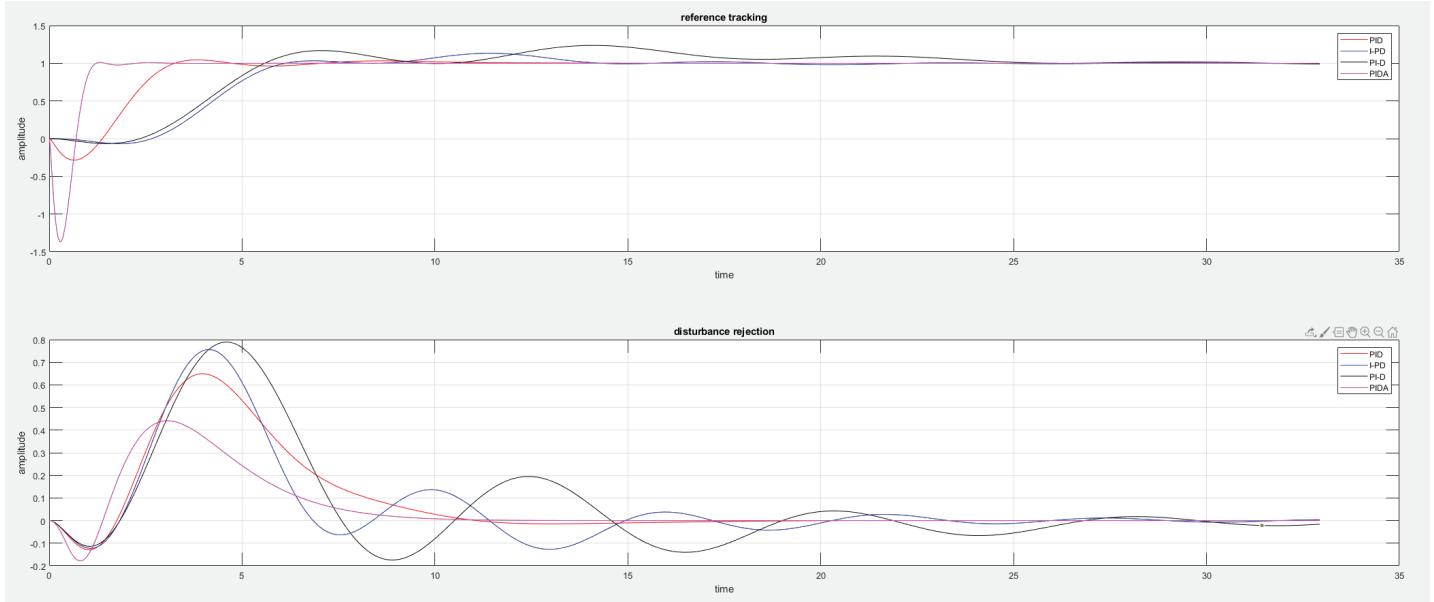
n=0,2



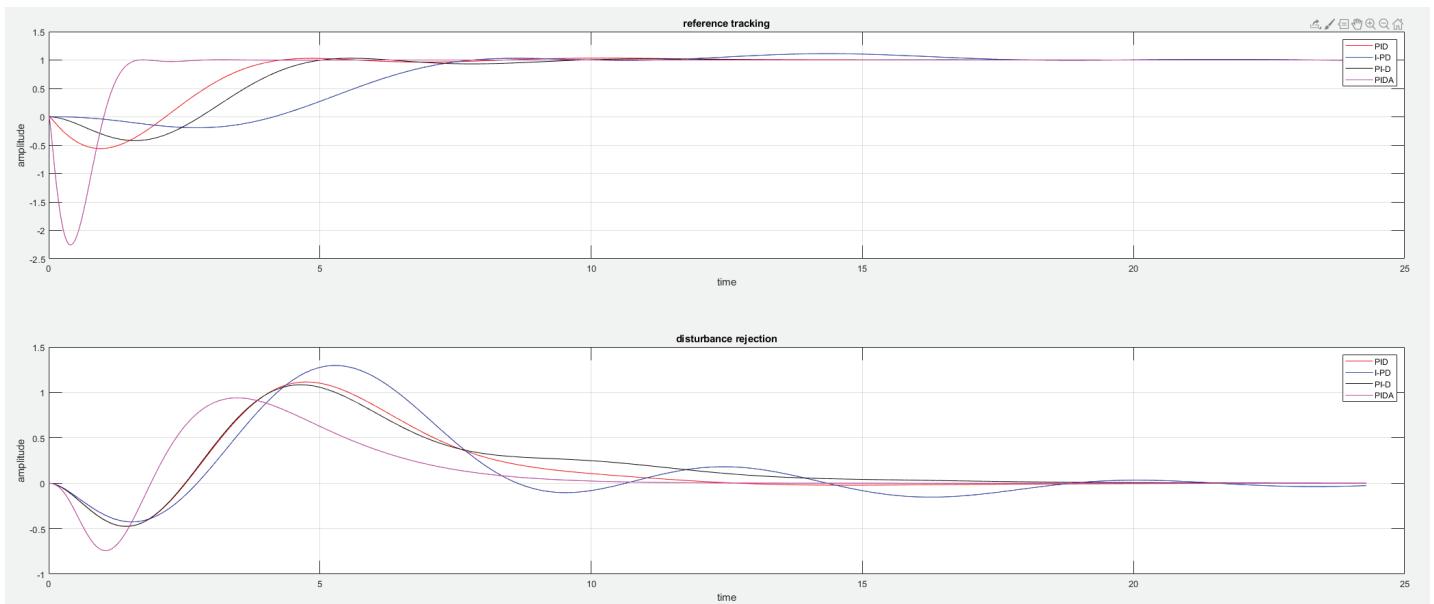
n=0,5



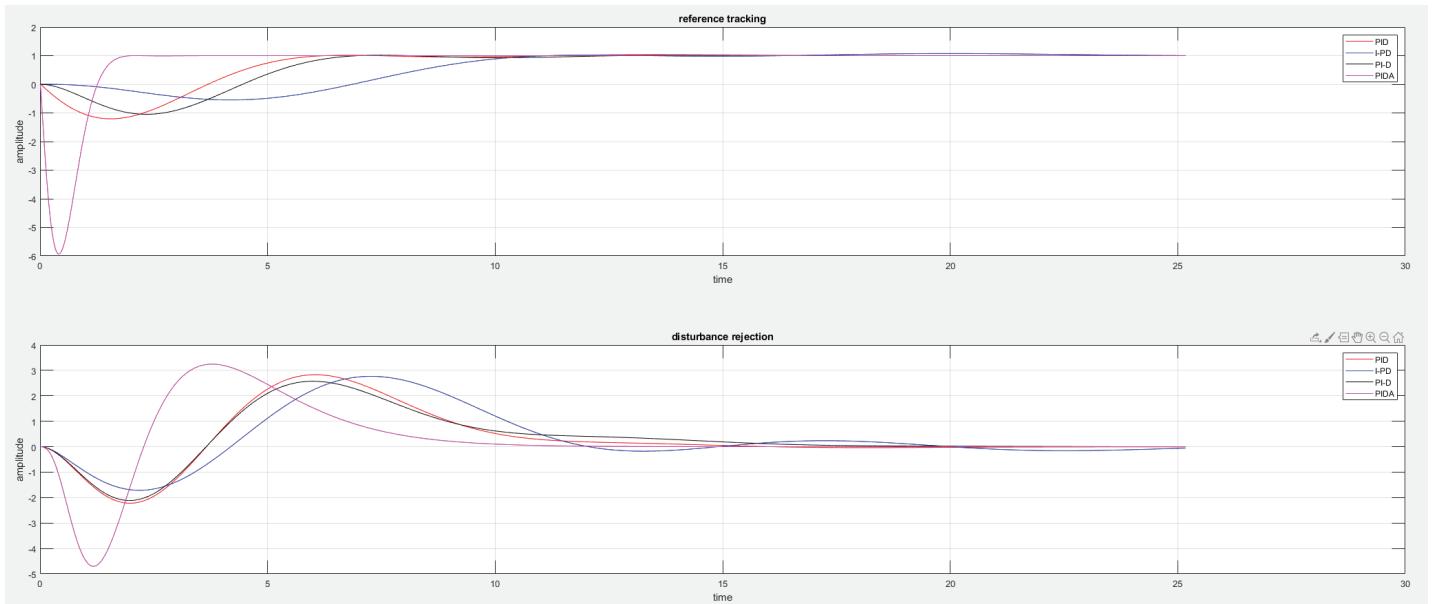
n=1



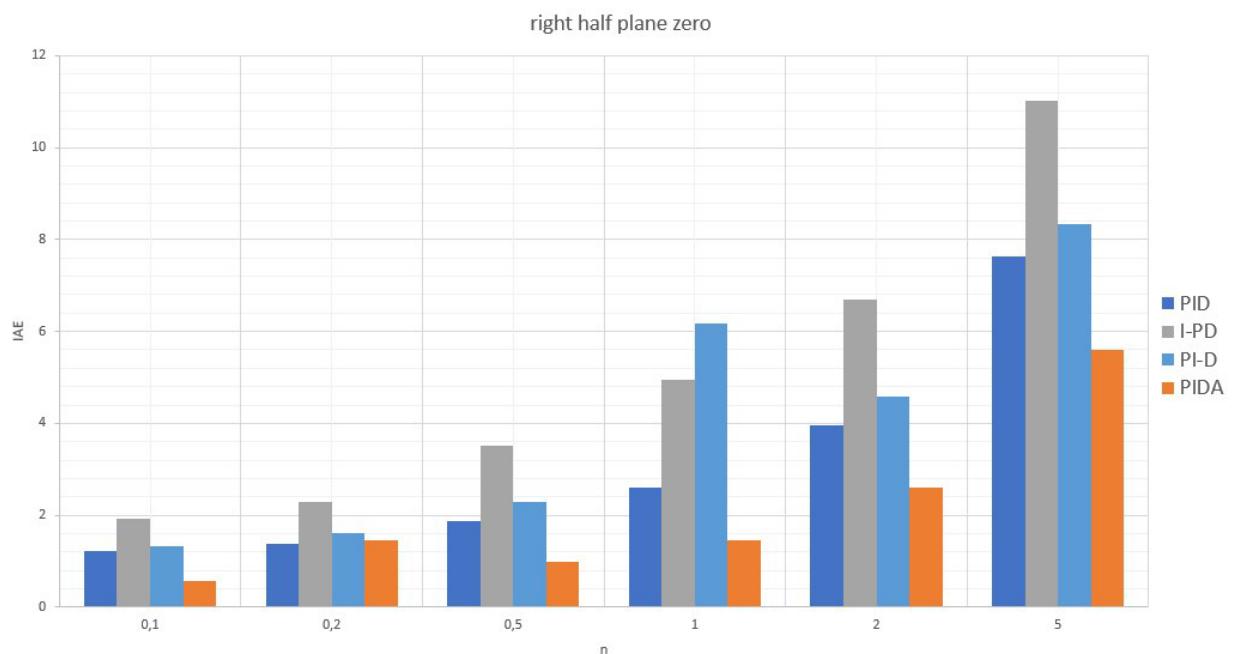
n=2



n=5



Trend IAE

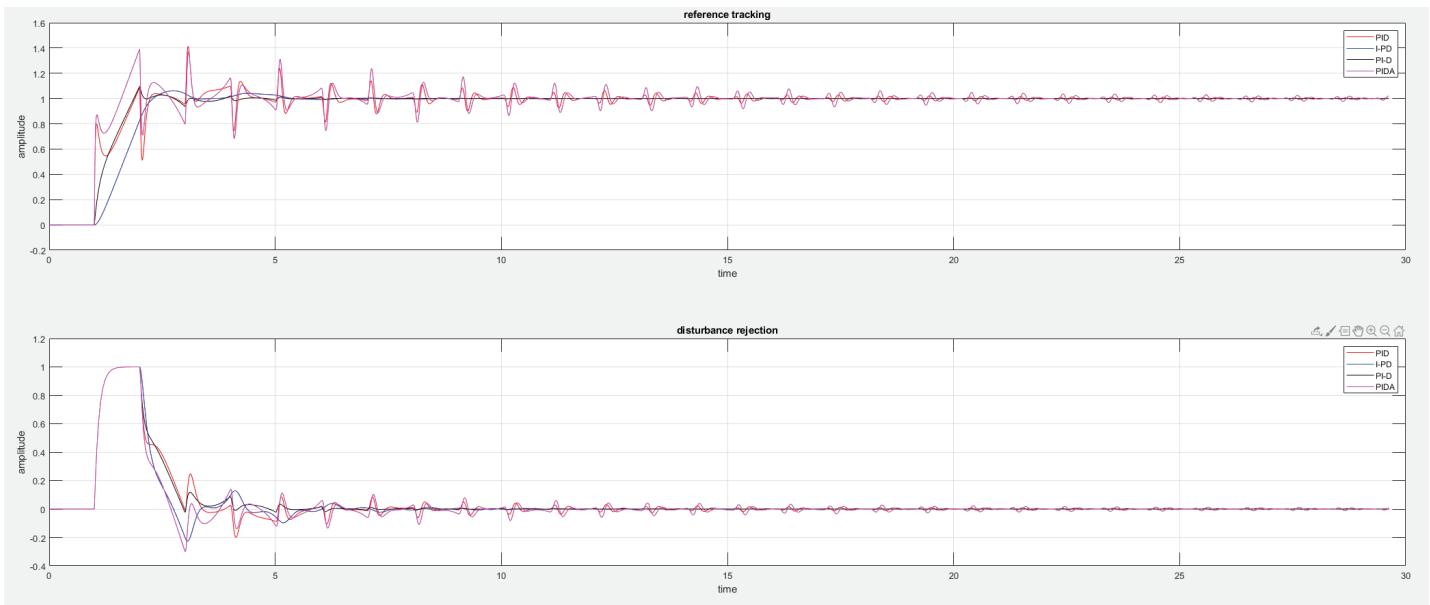


Time Delay and Lag

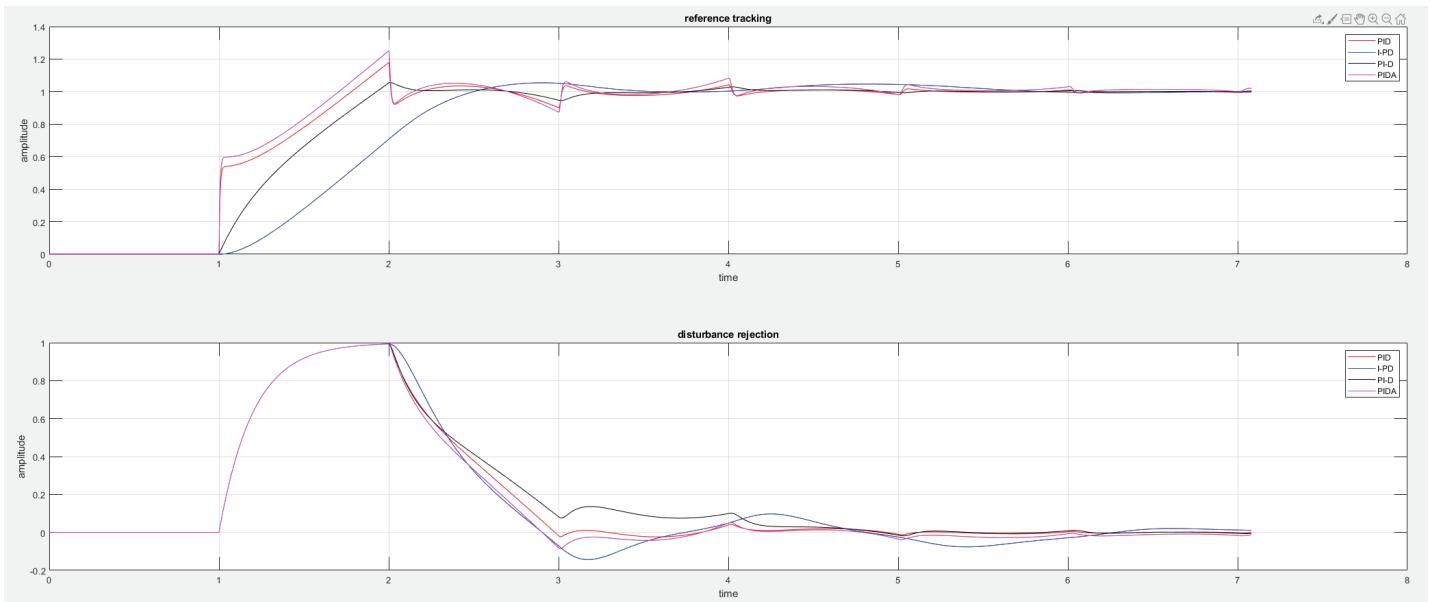
$n=0,1$

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

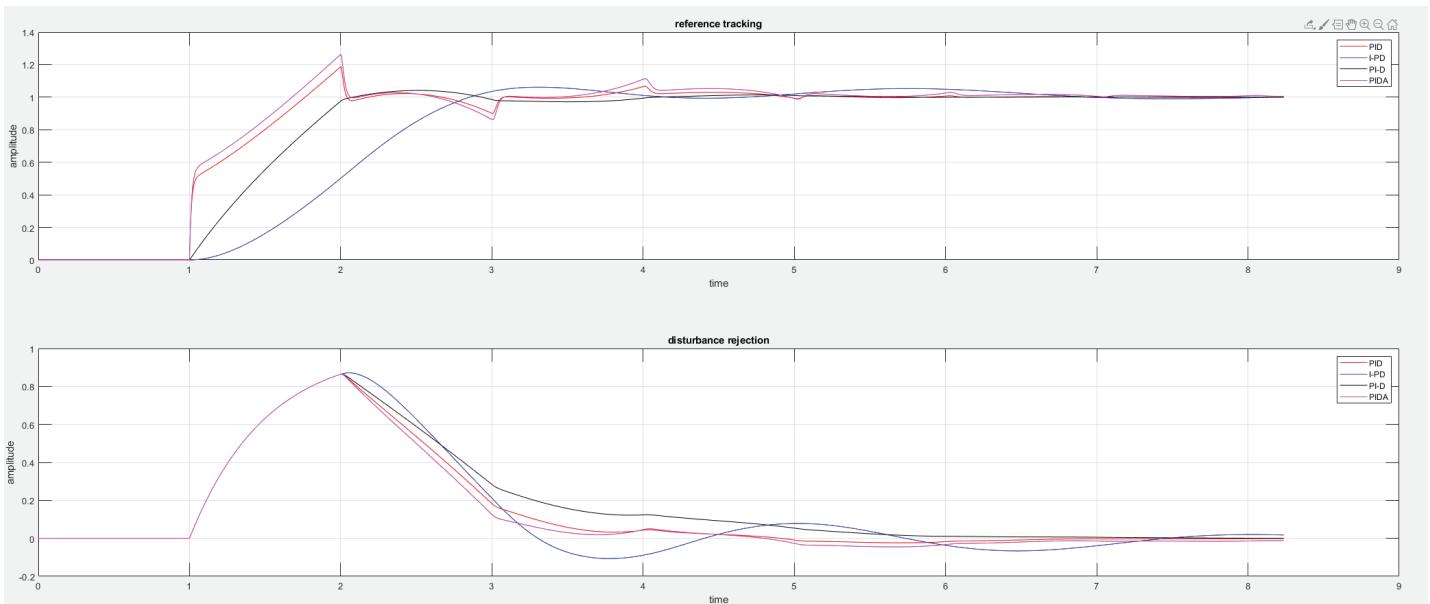
$$T = 0, 0.1, 0.2, 0.5, 2, 5, 10$$



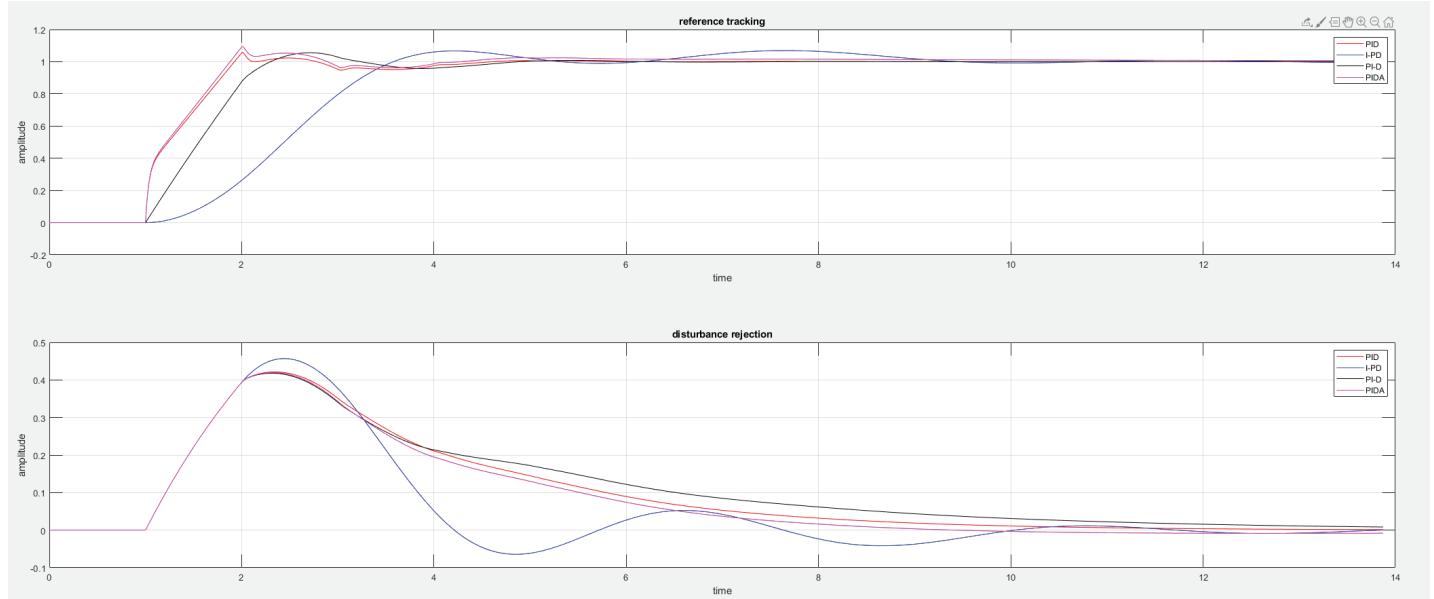
$n=0,2$



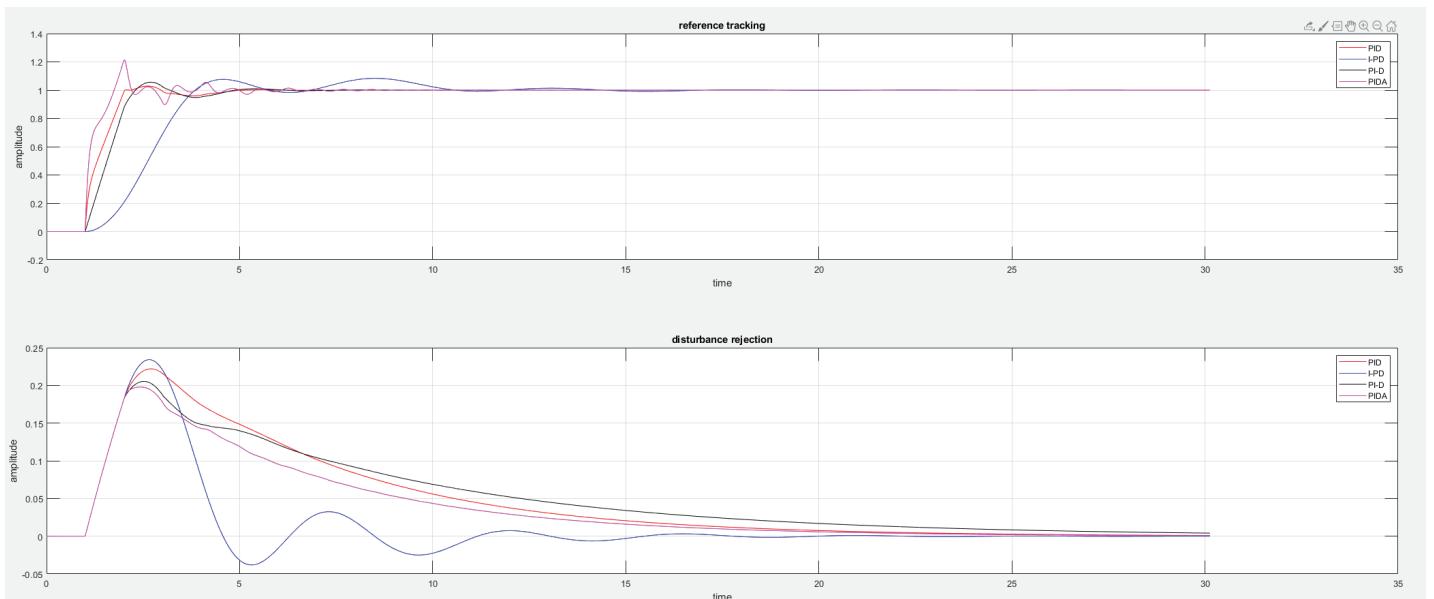
$n=0,5$



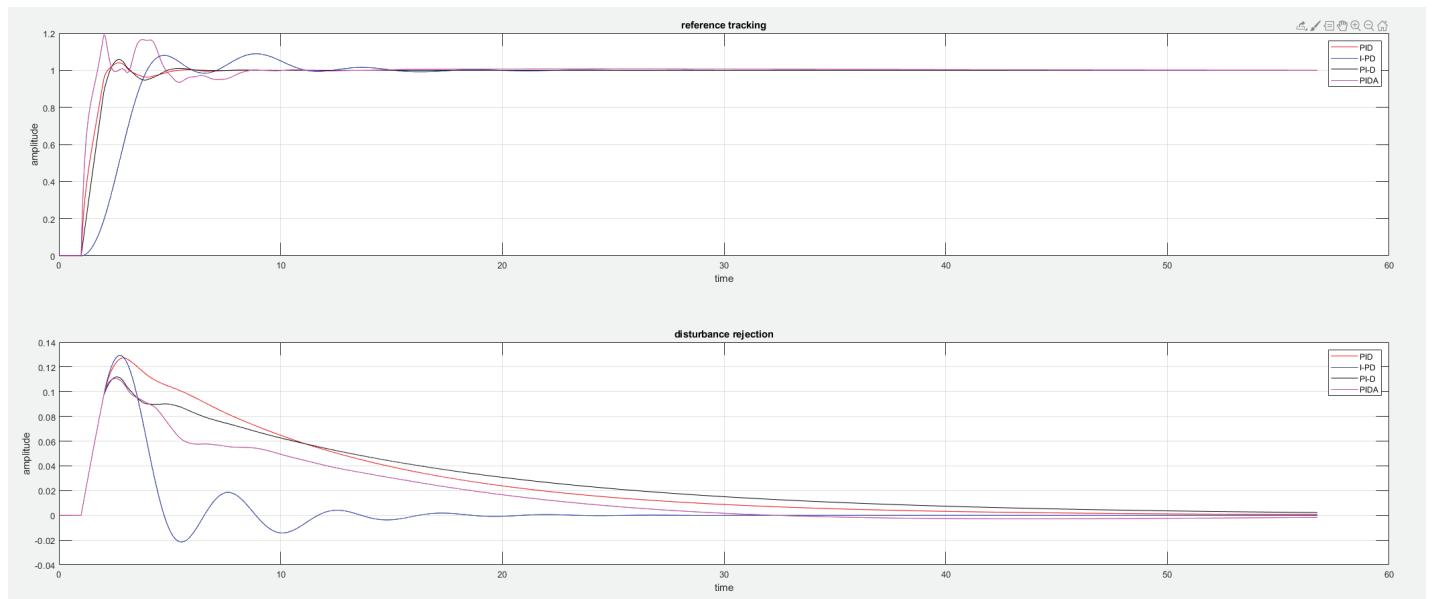
n=2



n=5

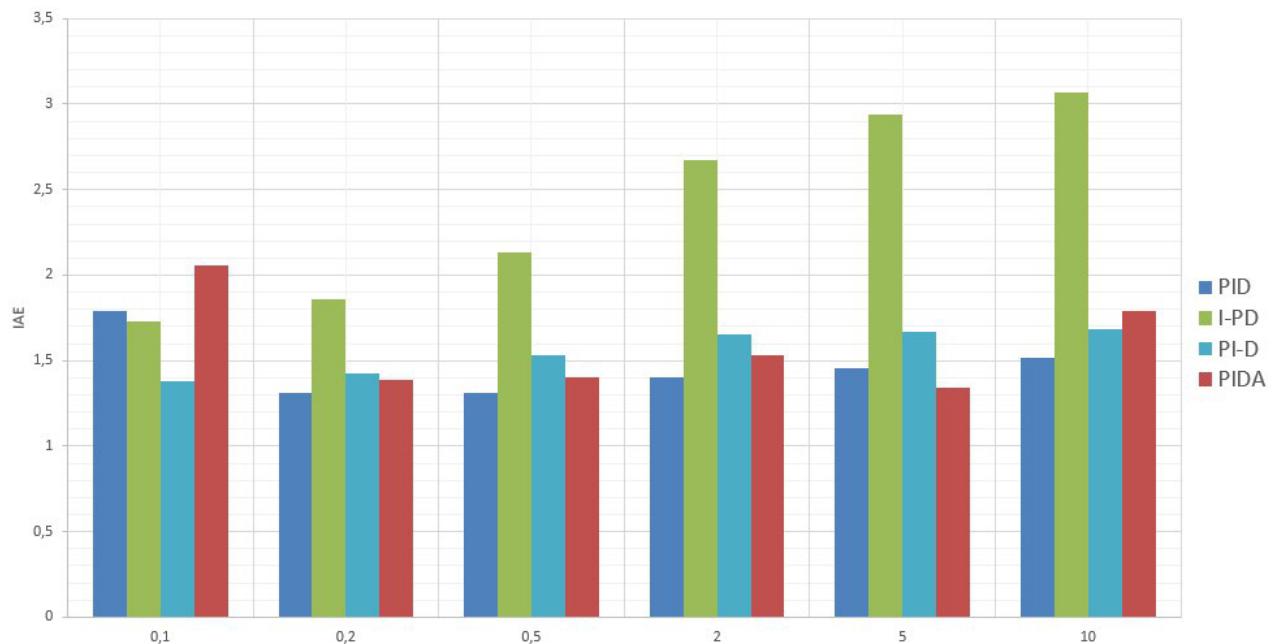


n=10



Trend IAE

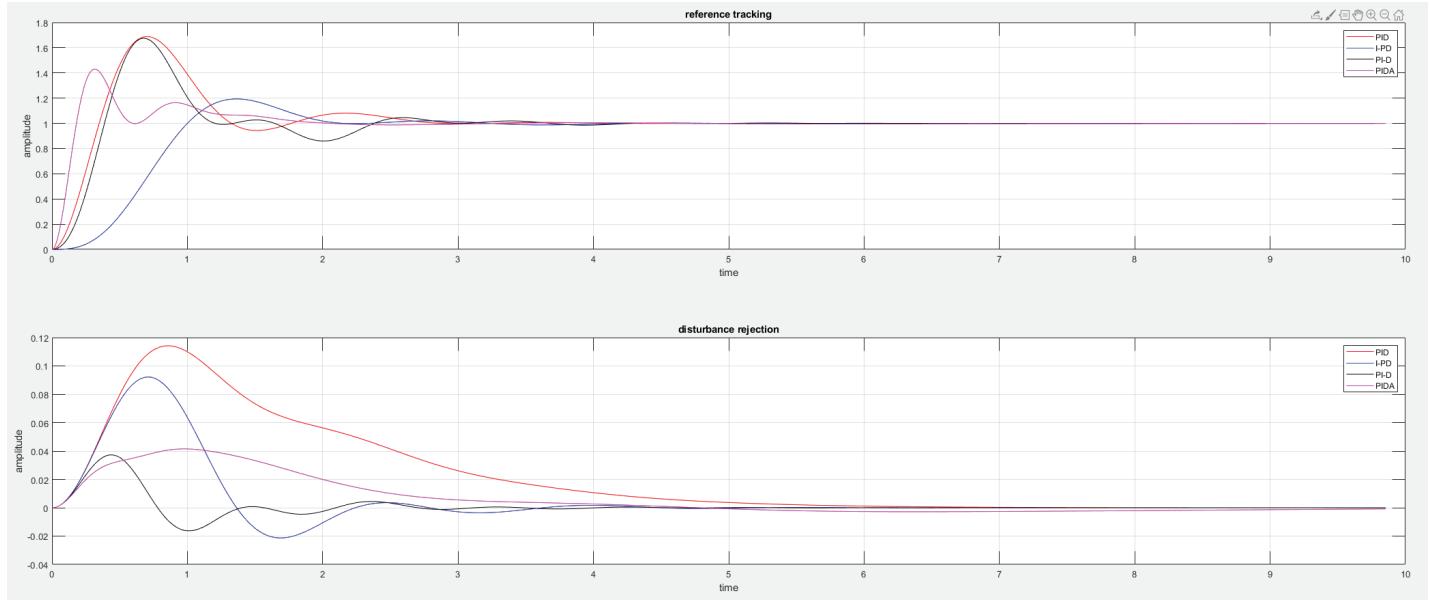
time delay and lag



Unstable Poles

$$G(s) = \frac{1}{s^2 - 1}$$

$n=0,1$



trend IAE

