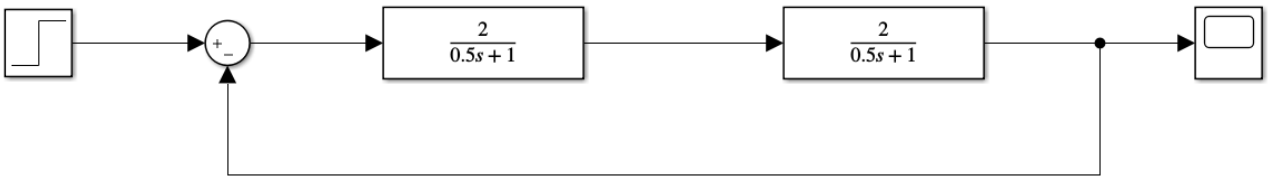
Lab work #3

Process Control Analysis

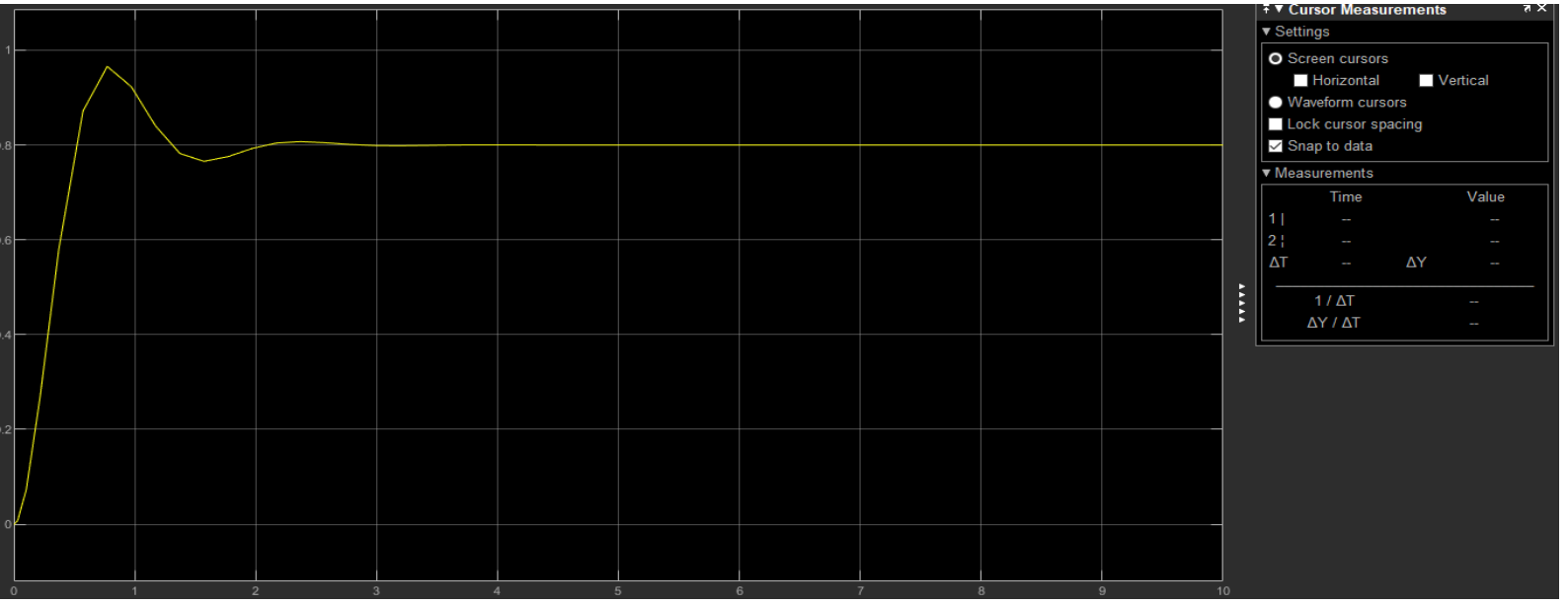
1- Unitary step input

No.	$W_1(s)$	$W_2(s)$
1	$\frac{2}{0{,}5s+1}$	$\frac{2}{0{,}5s+1}$
2	$\frac{10}{0{,}5s+1}$	$\frac{2}{0{,}5s+1}$

No.	$W_1(s)$	$W_2(s)$
3	$\frac{2}{0{,}5s+1}$	$\frac{1}{0{,}5s}$
4	$\frac{10}{0{,}5s+1}$	$\frac{1}{0{,}5s}$



STEP RESPONSE

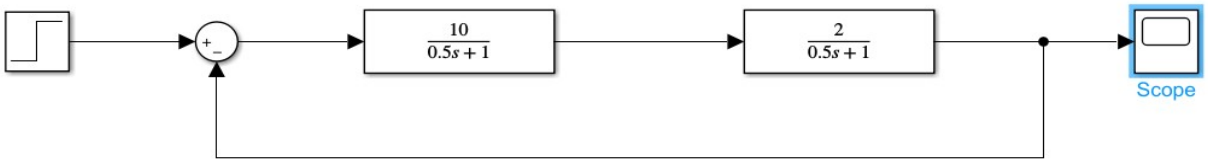


Overshoot = C(ts)-finalvalue/finalvalue x 100 = 0.960 – 0.800 = 0.160 / 0.8 x 100 = 20 = %20

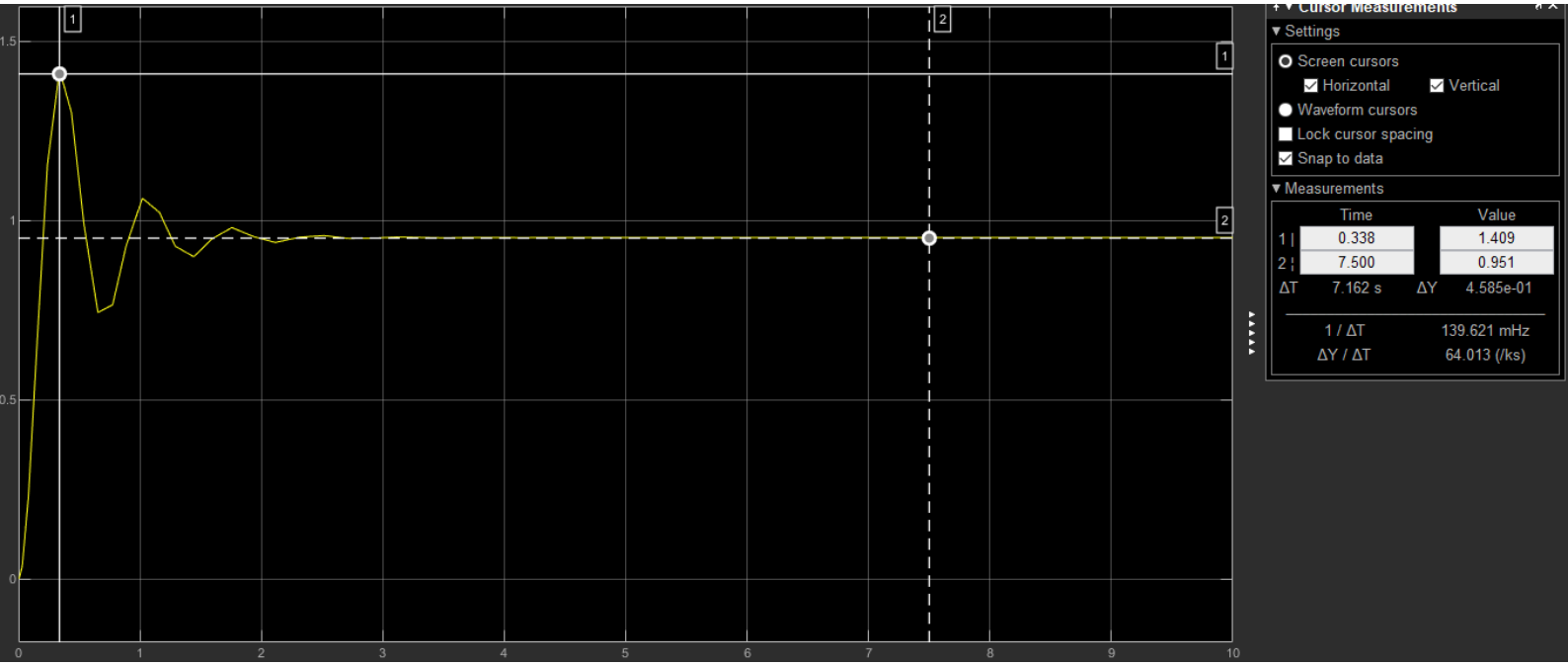
Settling Time = 1.832 s (acording to Tolerance Band)

(2 / 0.5s +1) * (2 / 0.5s +1) / 1 + (2 / 0.5s +1) * (2 / 0.5s +1) = 0.64

0.8 * 0.64 = 0.512 steady state value



STEP RESPONSE

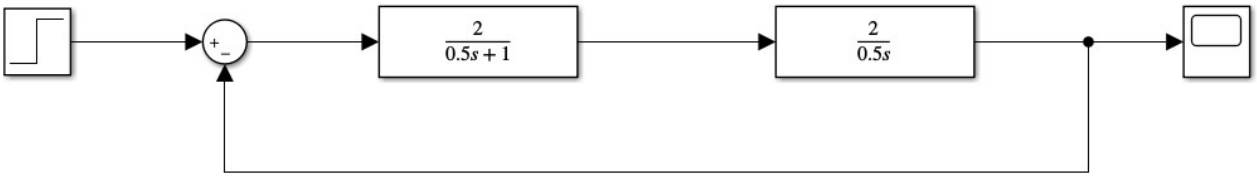


Overshoot = C(ts)-finalvalue/finalvalue x 100 = 1.409 – 0.951 = 0.458
0.458 / 0.951 x 100 = 48.16 = %48.16

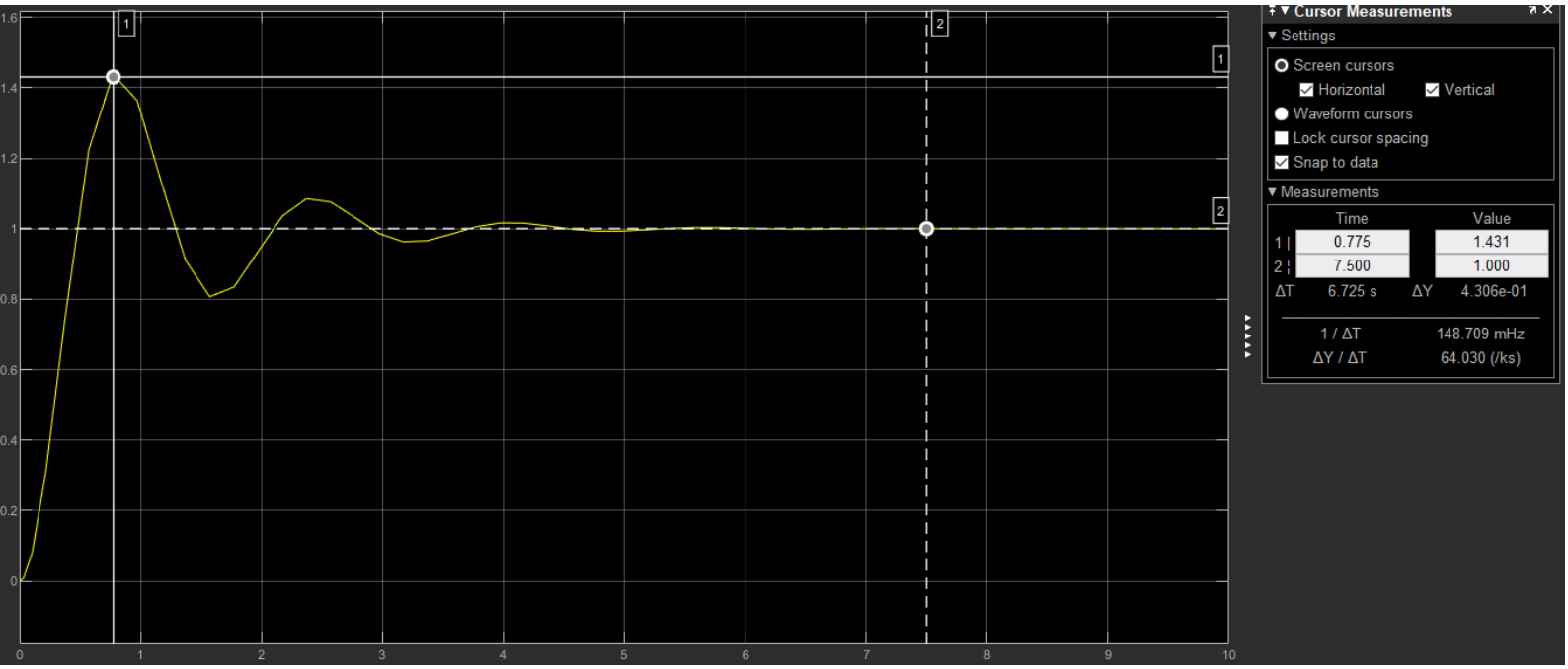
Settling Time = 1.537 s (acording to Tolerance Band)

(10 / 0.5s +1) * (2 / 0.5s +1) / 1 + (10/ 0.5s +1) * (2 / 0.5s +1) = 0.97799511

0.951 * 0.997799511 = 0.9300733496 steady state value



Step Response

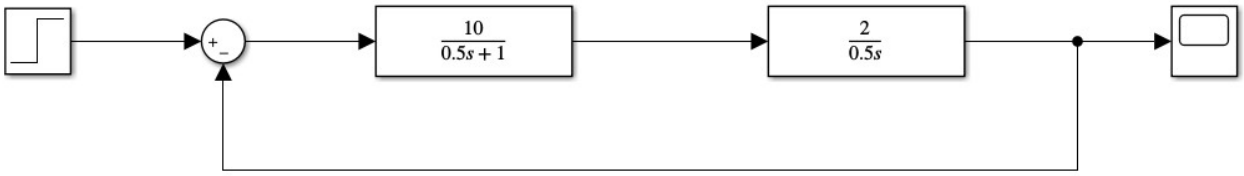


Overshoot = C(ts)-finalvalue/finalvalue x 100 = 1.431 – 1 = 0.431
0.431 / 1 x 100 = 43.1 = %43.1

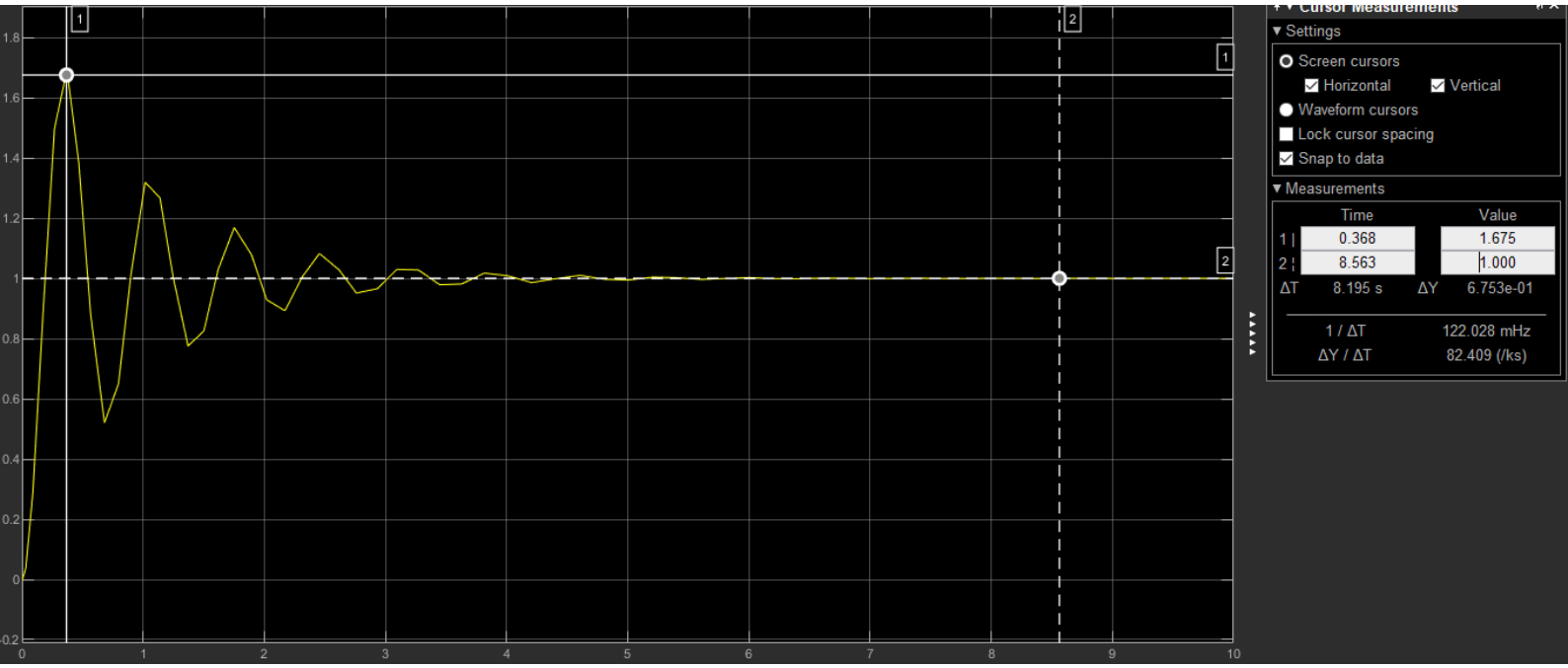
Settling Time = 0.775 s (acording to Tolerance Band)

(2 / 0.5s +1) * (2 / 0.5s) / 1 + (2/ 0.5s +1) * (2 / 0.5s) = 0.8421052632

1 * 0.8421052632 = 0.8421052632 steady state value



STEP RESPONSE



Overshoot = C(ts)-finalvalue/finalvalue x 100 = 1.675 – 1 = 0.675
0.675 / 1 x 100 = 67.5 = %67.5

Settling Time = 2.268 s (acording to Tolerance Band)

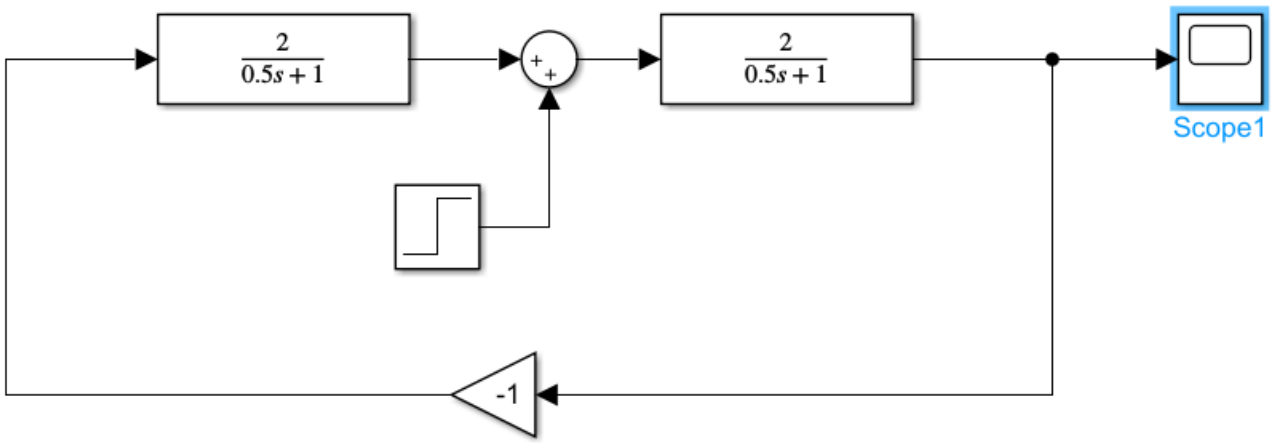
(10 / 0.5s +1) * (2 / 0.5s) / 1 + (10/ 0.5s +1) * (2 / 0.5s) = 0.9638554217

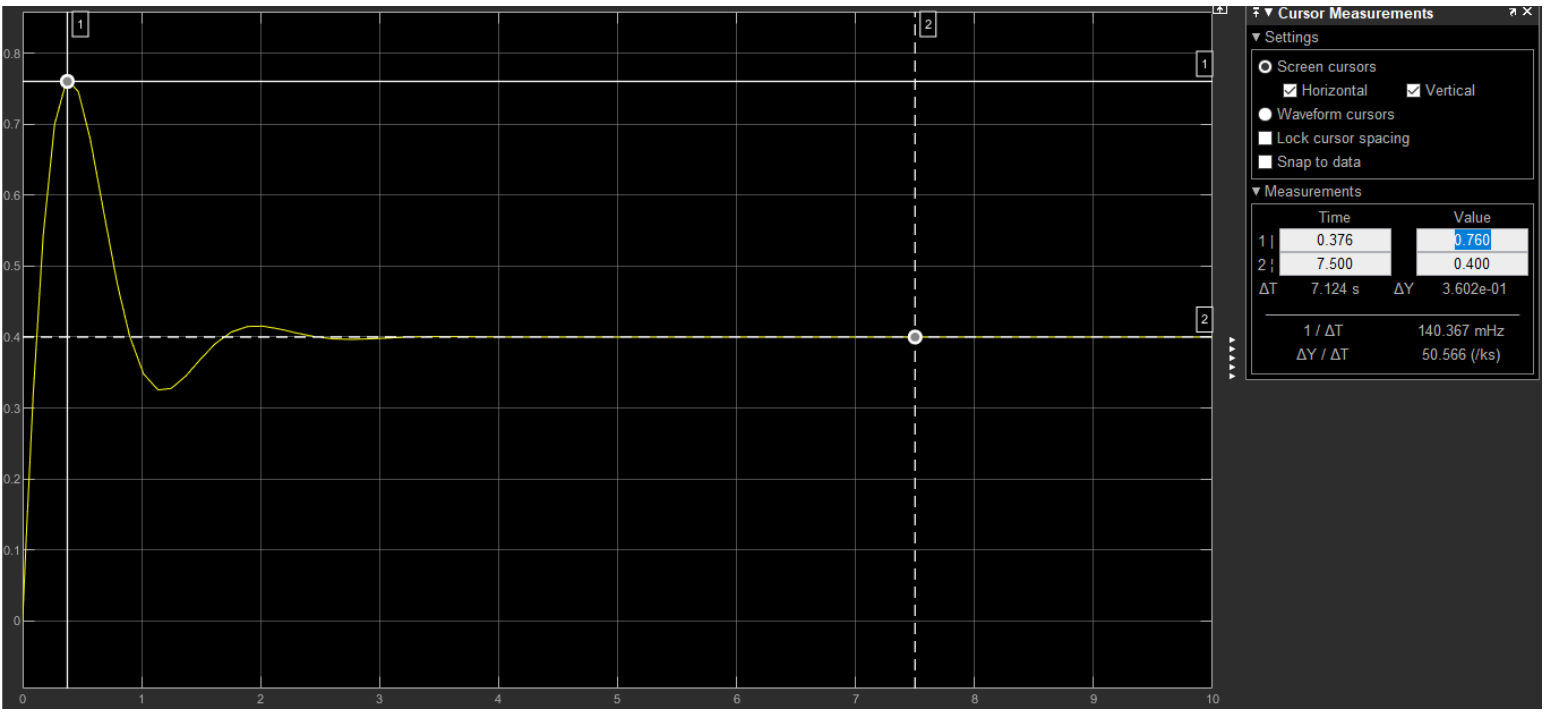
1 * 0.9638554217 = 0.9638554217 steady state value

2- Unitary Step distarbance input

No.	$W_1(s)$	$W_2(s)$
1	$\frac{2}{0{,}5s+1}$	$\frac{2}{0{,}5s+1}$
2	$\frac{10}{0{,}5s+1}$	$\frac{2}{0{,}5s+1}$
3	$\frac{1}{0{,}25s}$	$\frac{2}{0{,}5s+1}$

No.	$W_1(s)$	$W_2(s)$
4	$\frac{1}{0{,}05s}$	$\frac{2}{0{,}5s+1}$
5	$\frac{2}{0{,}5s+1}$	$\frac{1}{0{,}25s}$
6	$\frac{10}{0{,}5s+1}$	$\frac{1}{0{,}25s}$



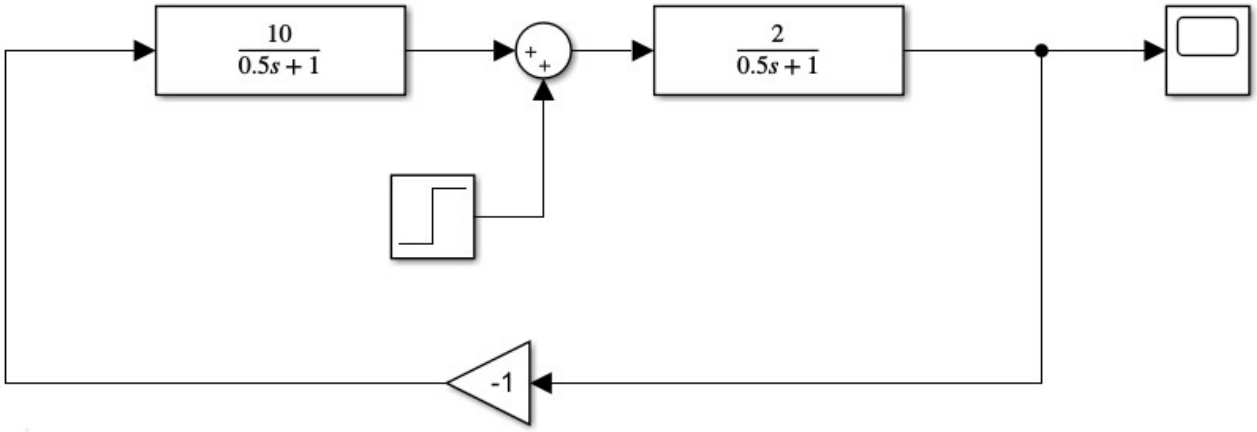


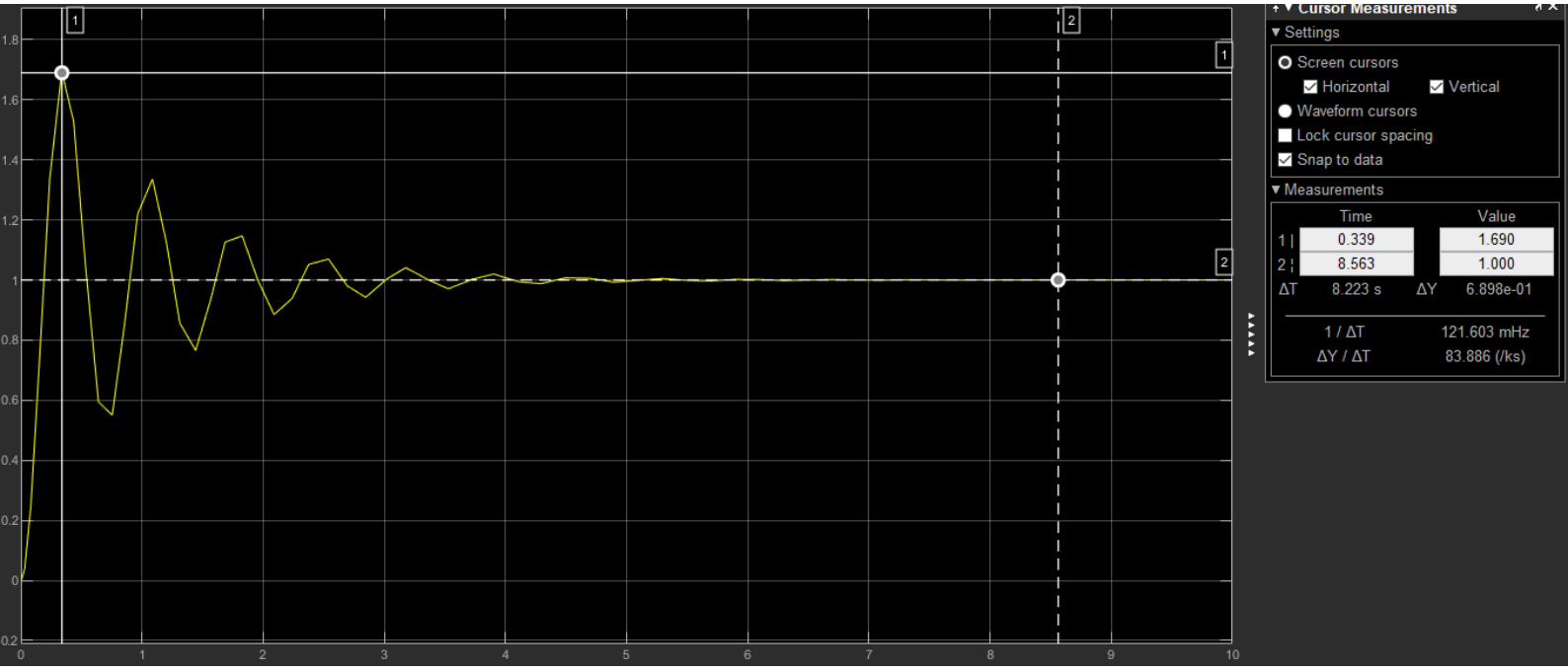
Overshoot = C(ts)-finalvalue/finalvalue x 100 = 0.760 – 0.4 = 0.360
0.360 / 0.4 x 100 = 90 = %90

Settling Time = 1.565 s (acording to Tolerance Band)

(2 / 0.5s +1) * (2 / 0.5s +1) / 1 + (2 / 0.5s +1) * (2 / 0.5s +1) = 0.64

0.4 * 0.64 = 0.256 steady state value



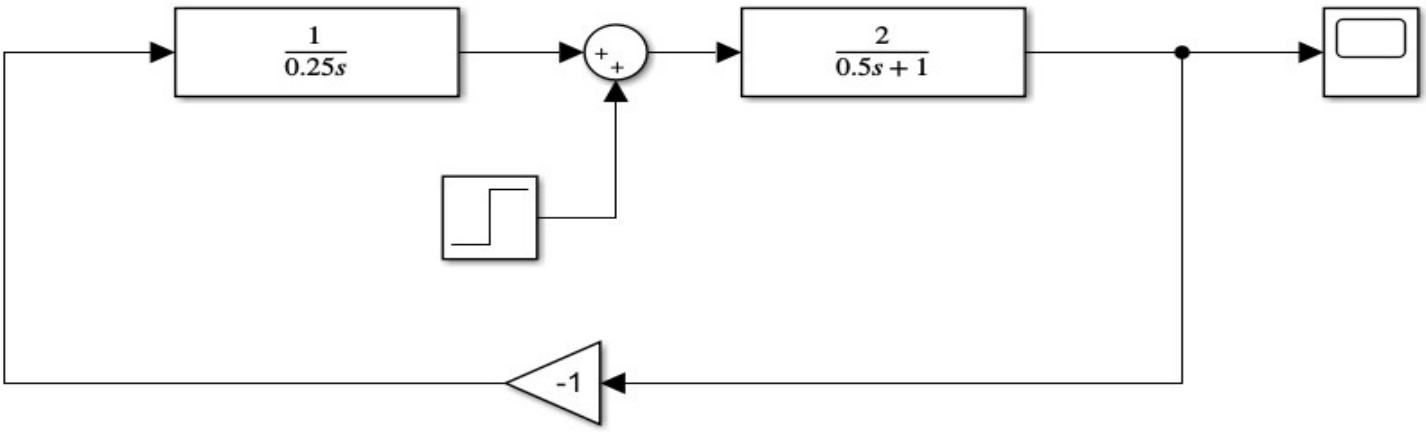


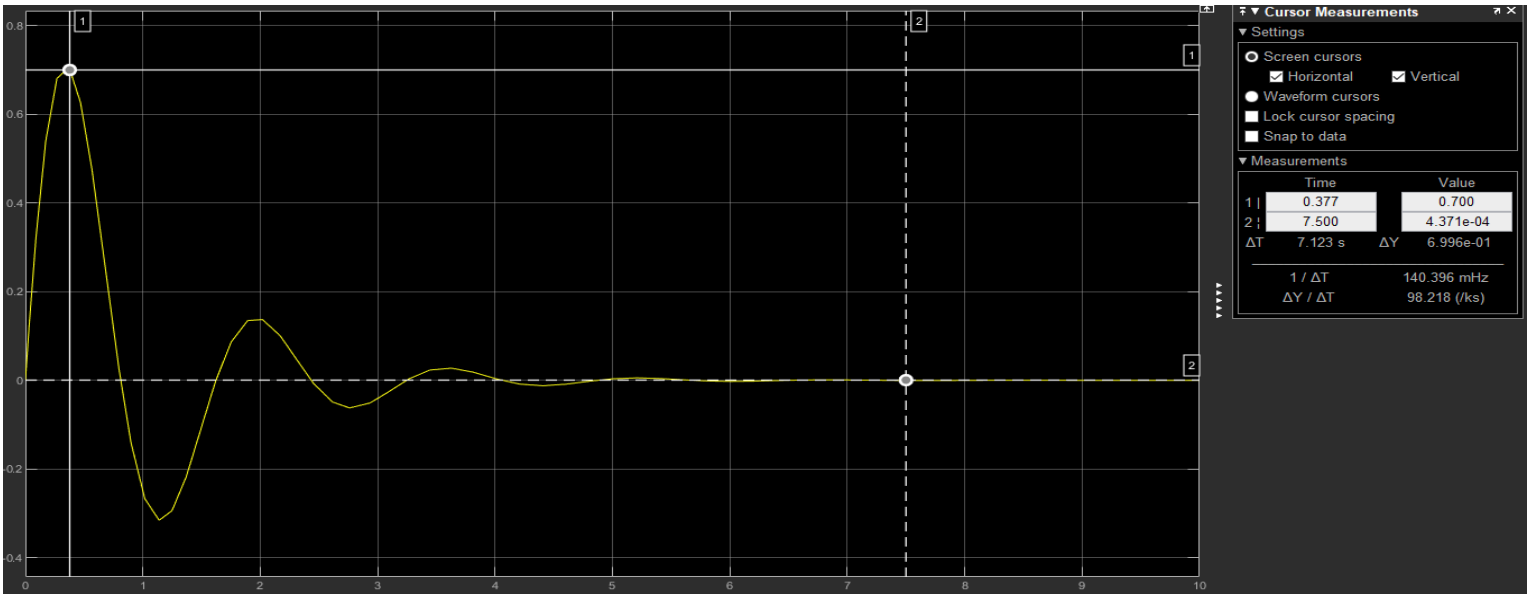
Overshoot = C(ts)-finalvalue/finalvalue x 100 = 1.690 – 1 = 0.690
0.690 / 1 x 100 = 69 = %69

Settling Time = 2.350 s (acording to Tolerance Band)

(10 / 0.5s +1) * (2 / 0.5s +1) / 1 + (10/ 0.5s +1) * (2 / 0.5s +1) = 0.97799511

1 * 0.97799511= 0.97799511 steady state value



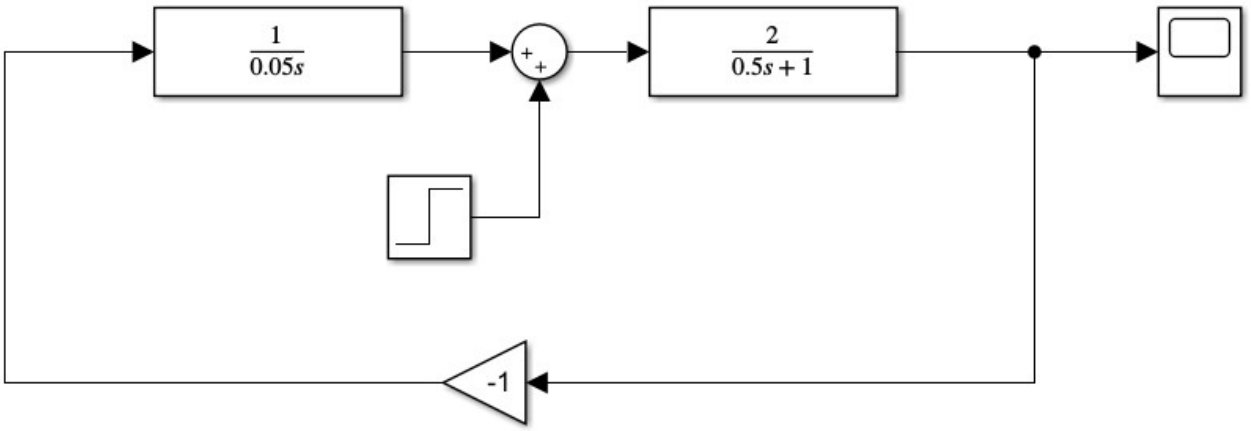


Overshoot = C(ts)-finalvalue/finalvalue x 100 = 0.700 – 4.371e-04 = −15.18160987
−15.18160987 / 1 x 100 = −15.18 = -15.18%

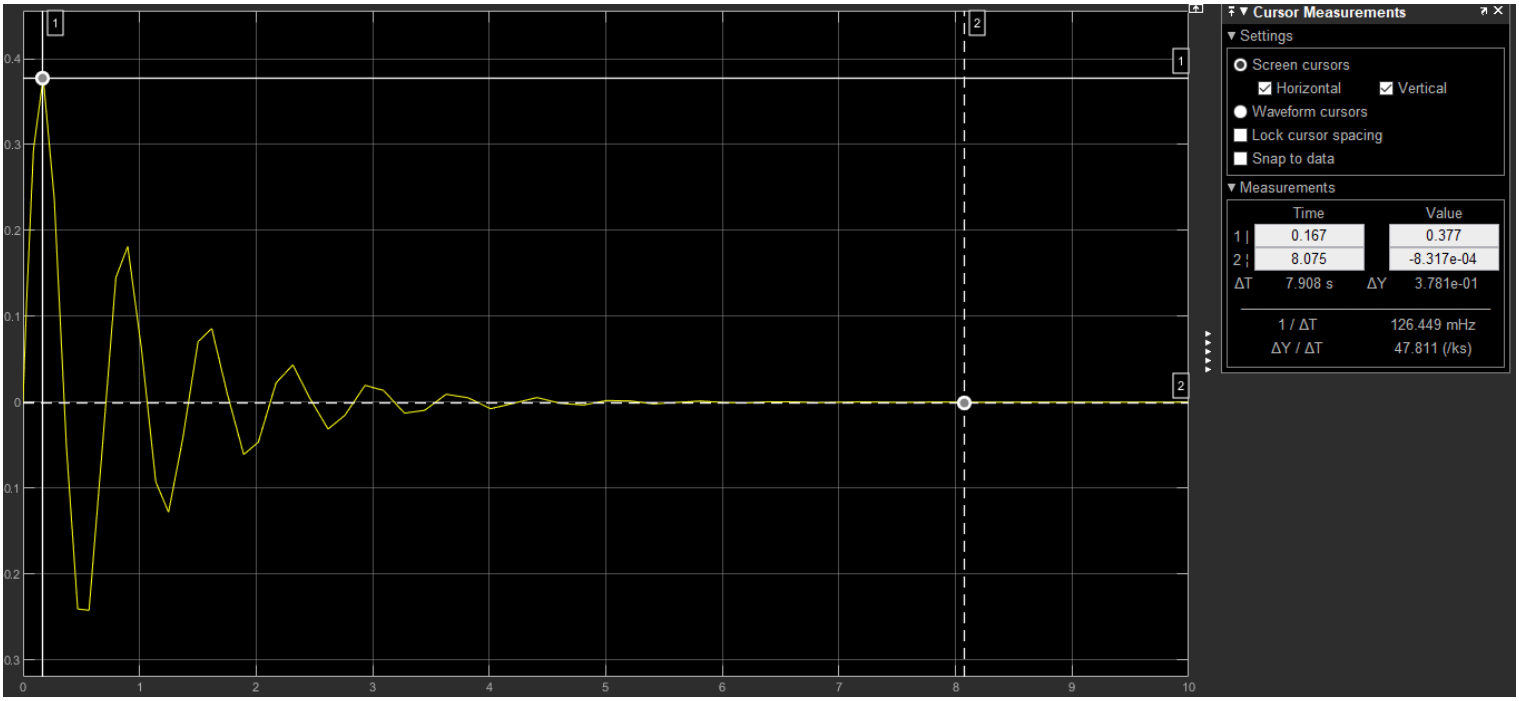
Settling Time = 3.090 s (acording to Tolerance Band)

(1 / 0.25s) * (2 / 0.5s +1) / 1 + (1/ 0.25s) * (2 / 0.5s +1) = 0.8421052632

4.371e-04 * 0.8421052632= 6.637145156 steady state value



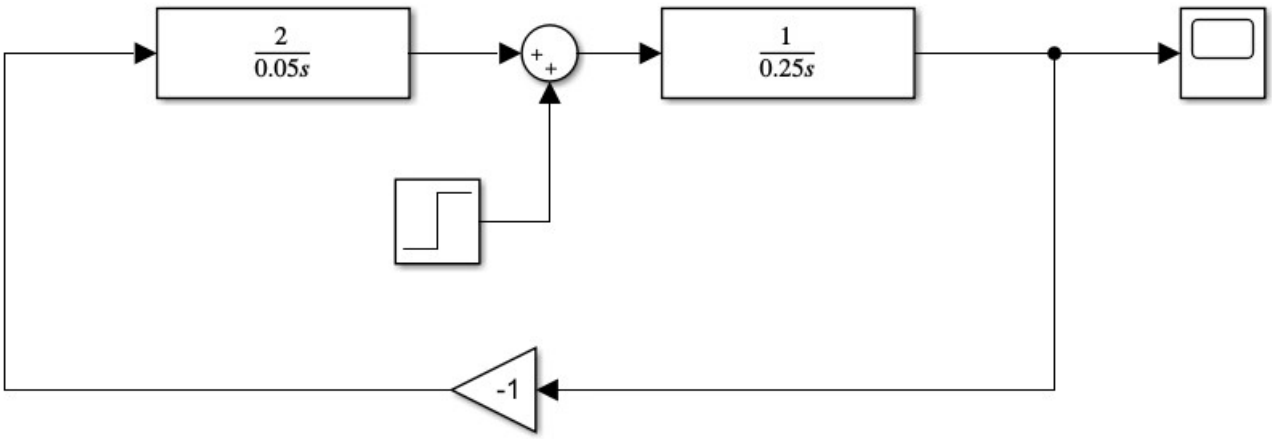
STEP RESPONSE

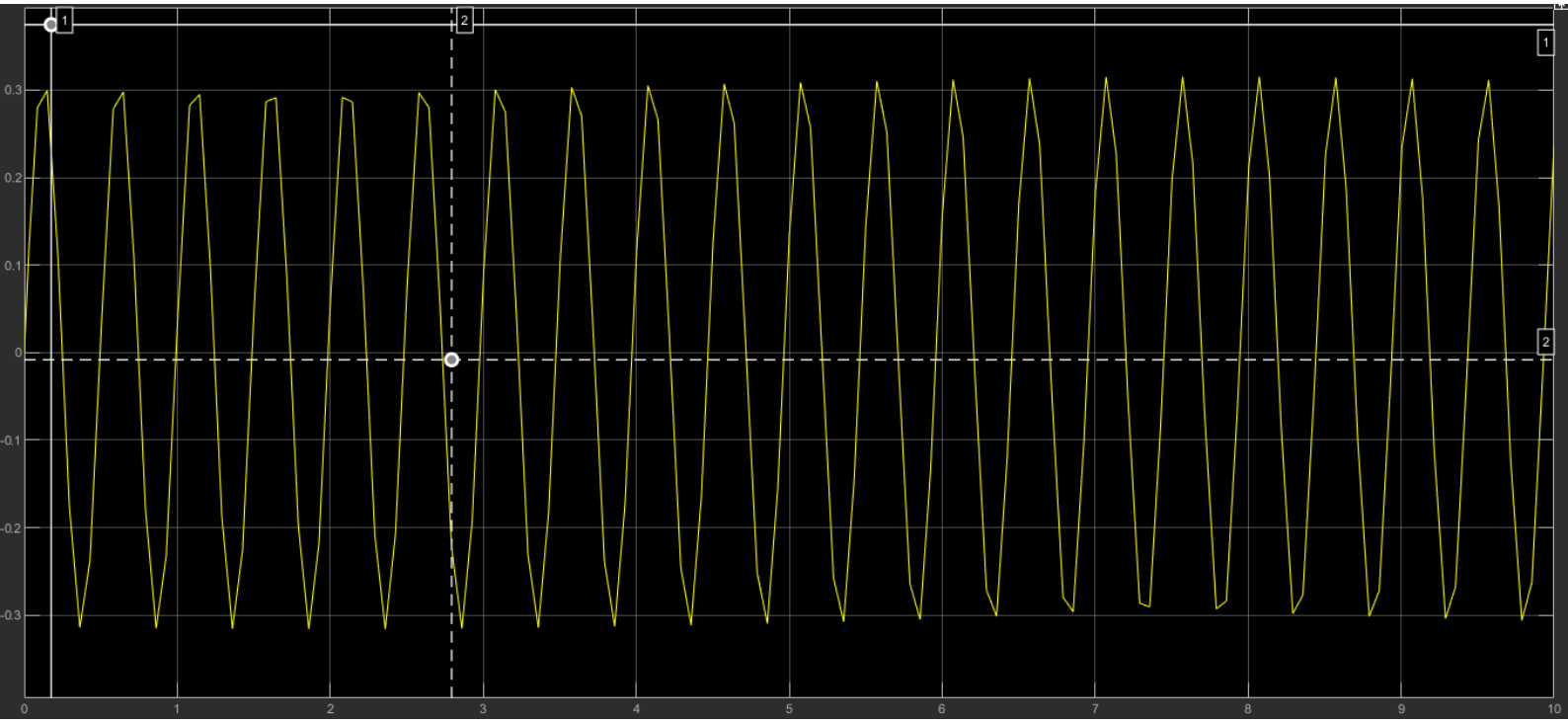


Overshoot = C(ts)-finalvalue/finalvalue x 100 = 0.377 – 0 = 0.377
0.377 / x 100 = 37.7%

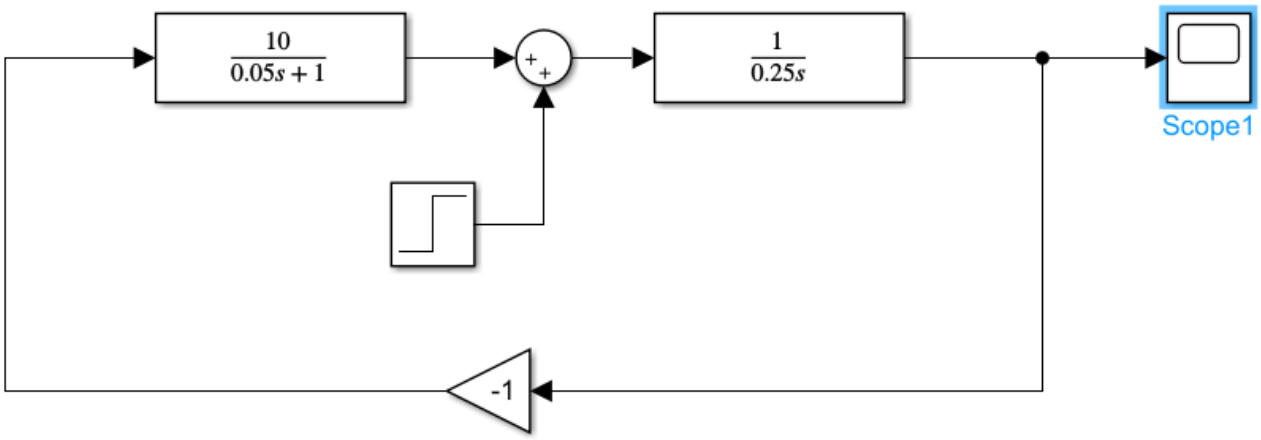
Settling Time = 2.794 s (acording to Tolerance Band)

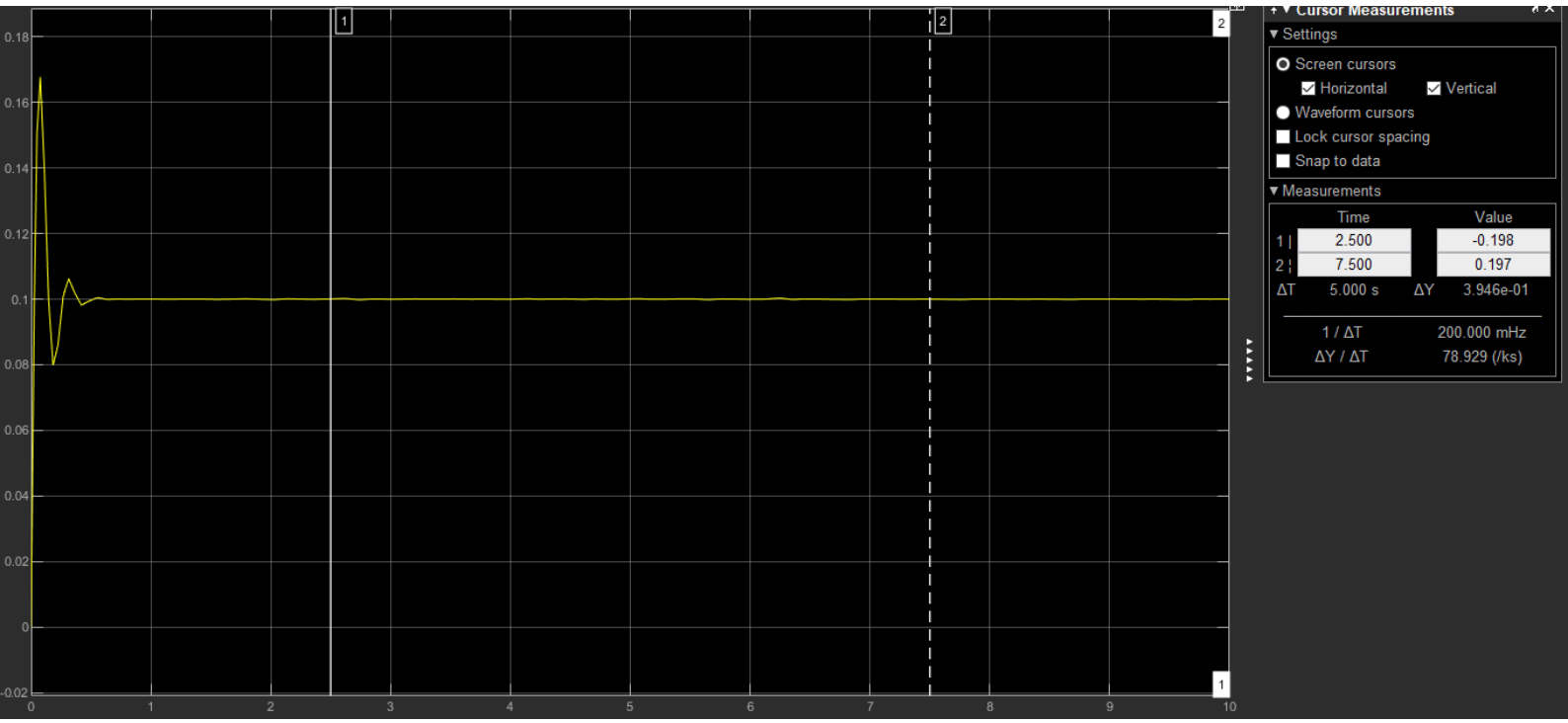
(1 / 0.05s) * (2 / 0.5s +1) / 1 + (1/ 0.05s) * (2 / 0.5s +1) = 0.9638554217
0 * 0.9638554217= 0 steady state value





UNUSUAL SCOPE RESPONSE,
CANT FIND SETLING TIME BECAUSE IT DOESNT SET





Overshoot = C(ts)-finalvalue/finalvalue x 100 = 0.167 – 0.1 = 0.067
0.067 / 0.1 x 100 = 67%

Settling Time = 0.072 s (acording to Tolerance Band)

(10 / 0.5s+1) * (1 / 0.25) / 1 + (10 / 0.5s+1) * (1 / 0.25) = 0.9638554217
0.1 * 0.9638554217= 0.09638554217 steady state value