

ECE 461/661 Handout #18

Error Constants

1) Determine the system type, the error constants, and the steady-state error for a step input:

G(s)	System Type	K _p	K _v	Steady-state error for a unit step input
$\left(\frac{200}{(s+3)(s+6)}\right)$				
$\left(\frac{2000}{(s+3+j10)(s+3-j10)(s+20)}\right)$				
$\left(\frac{20}{s(s+3)(s+6)}\right)$				
$\left(\frac{200}{(s-1)(s+5)(s+10)}\right)$				

Error Constants

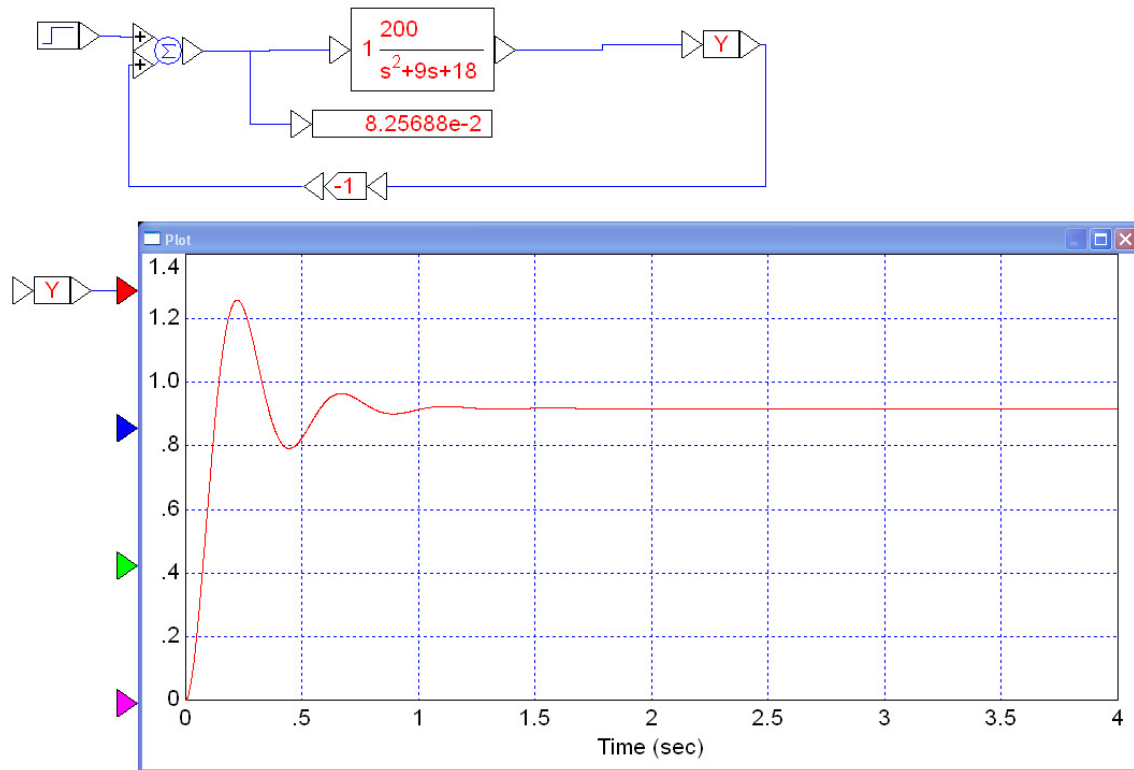
Handout for Lecture #18 for ECE 461/661 Controls Systems

1) Determine the system type, the error constants, and the steady-state error for a step input:

G(s)	System Type	K _p	K _v	Steady-state error for a unit step input
$\left(\frac{200}{(s+3)(s+6)}\right)$	0	11.11	0	0.0826
$\left(\frac{2000}{(s+3+j10)(s+3-j10)(s+20)}\right)$	0	0.9174	0	0.5215
$\left(\frac{20}{s(s+3)(s+6)}\right)$	1	inf	1.11	0
$\left(\frac{200}{(s-1)(s+5)(s+10)}\right)$	0	-4.00	0	-0.333

Using VisSim

a) Error = 0.0826

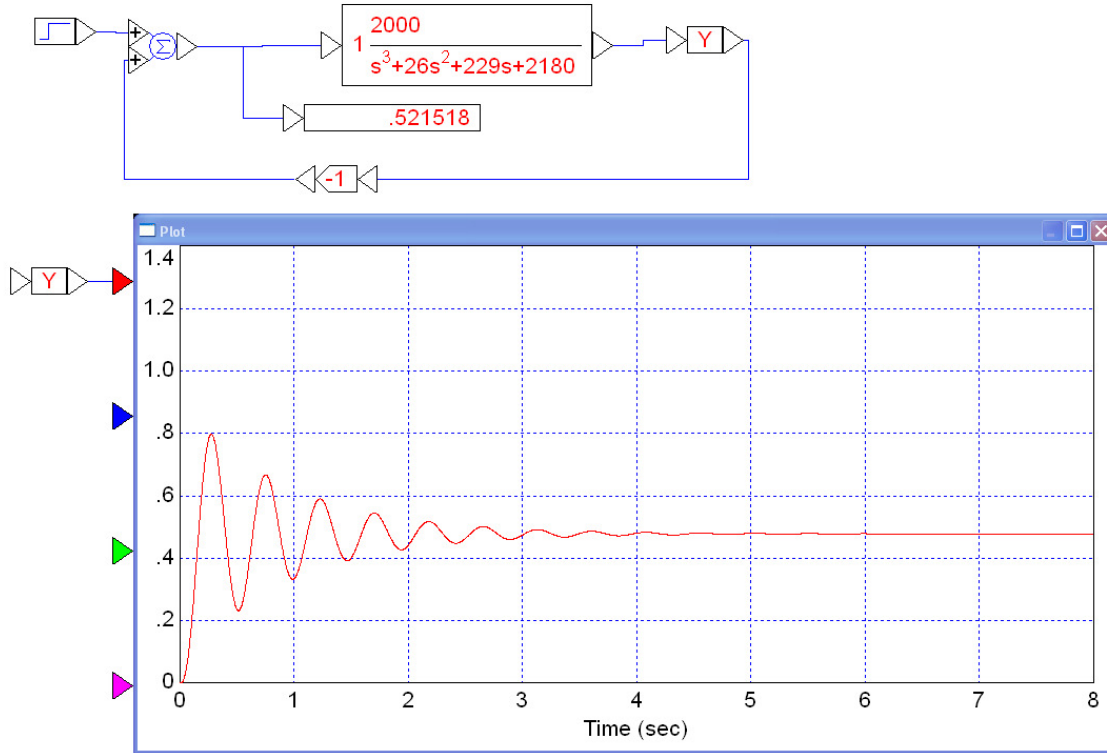


b) Error = 0.5215

```
>> poly([-20,-3+j*10,-3-j*10])
```

ans =

1 26 229 2180

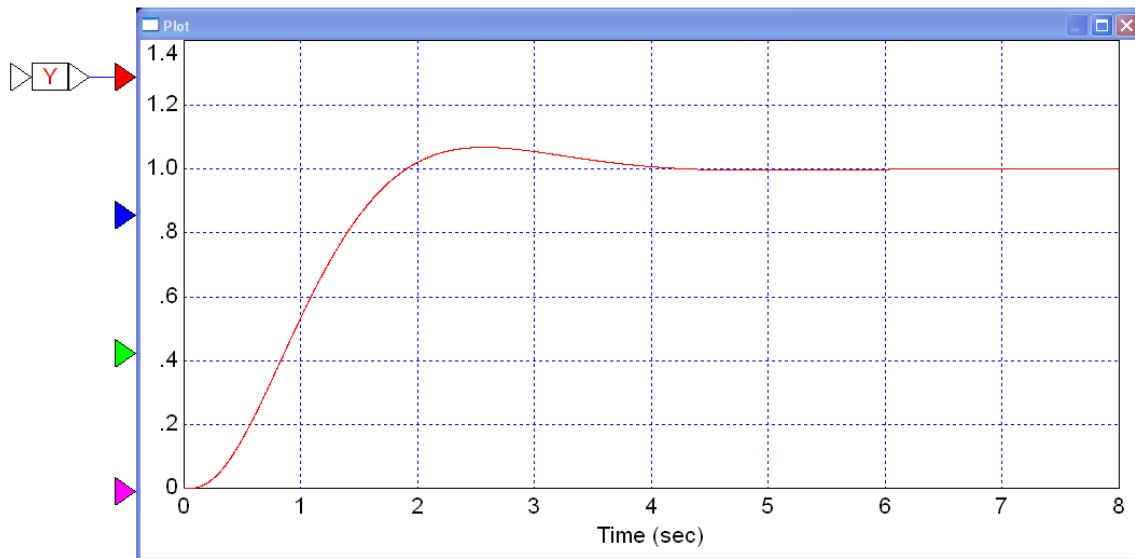
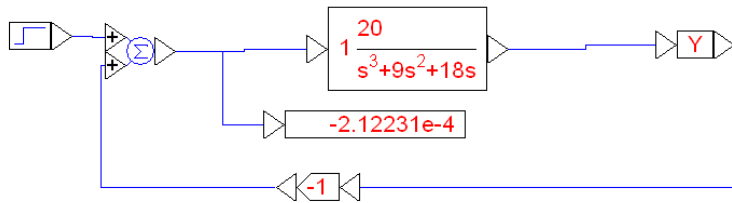


c) Error = 0

```
>> poly([0,-3,-6])
```

ans =

```
1 9 18 0
```



d) Error = -0.333

```
>> poly([1,-5,-10])
```

ans =

1 14 35 -50

