

## Q1 (C)

```
s = tf('s');
```

Plant transfer function

```
G = (100*(0.5*s+1))/(s*(0.2*s+1)*(s+10))
```

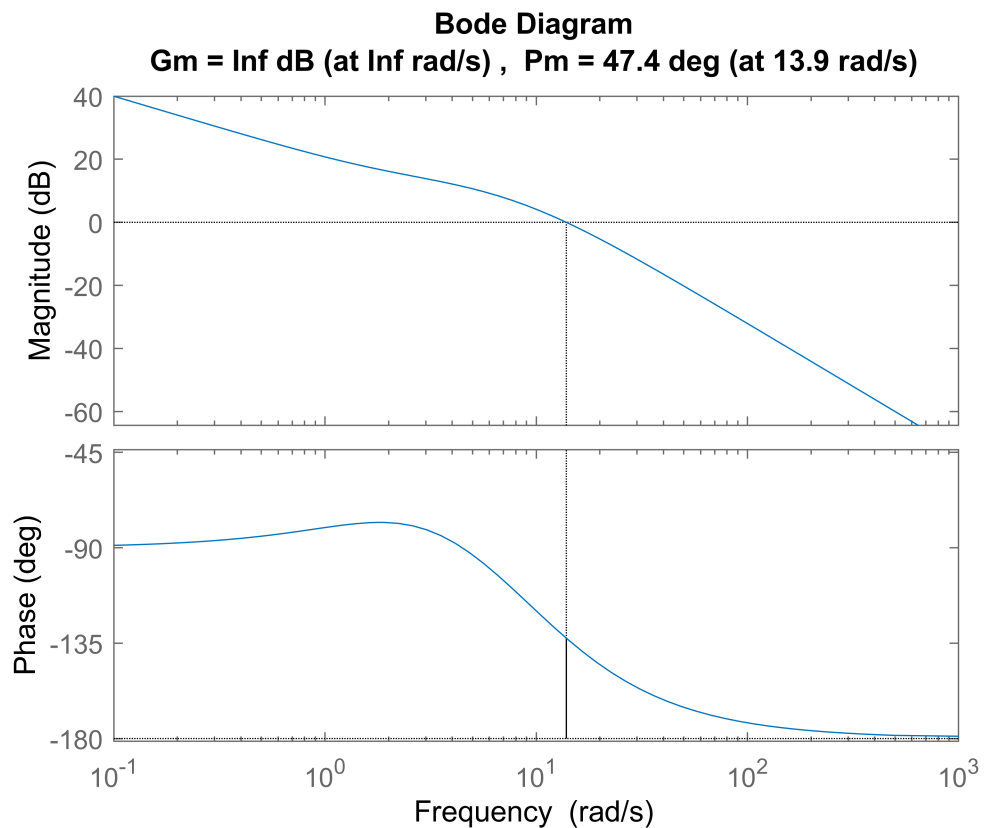
G =

$$\frac{50 s + 100}{0.2 s^3 + 3 s^2 + 10 s}$$

Continuous-time transfer function.

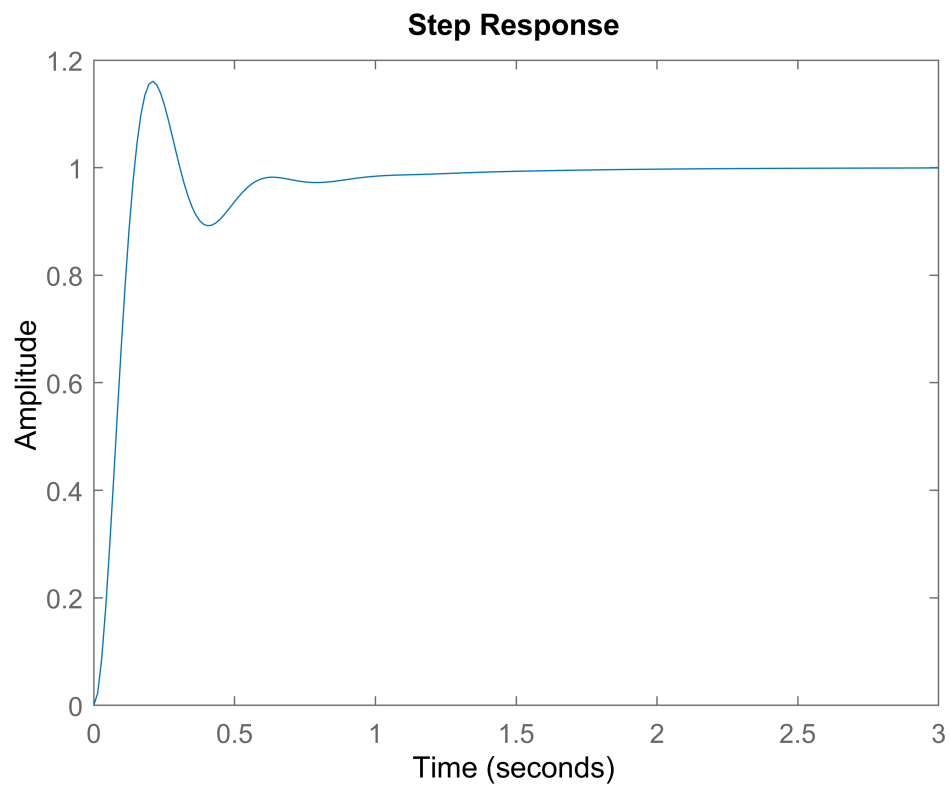
Compute the margins of the transfer function.

```
margin(G)
```



Step response of the closed-loop system

```
step(G/(1+G))
```



```
[Gm,Pm,Wcg,Wcp] = margin(G)
```

```
Gm = Inf  
Pm = 47.3637  
Wcg = Inf  
Wcp = 13.8869
```

The margins obtained using MATLAB are close to the ones obtained using the bode plots drawn by hand.

```
nyquist1(G)
```

