بسم الله الرحمن الرحيم

Control System Design: Assignment#2
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Norm of Systems:

We will find the norm of the following two transfer functions:

$$G_1(s) = \frac{3s+1}{s+1}, and\ G_2(s) = \frac{s+1}{3s+1}.$$

∵ these functions are proper, the is calculated using the H^{∞}-Norm:

∵ the system is stable, SISO,

∴ the norm will be:

$$\|G(s)\|_{\infty} = sub_{\omega}|G(j\omega)|$$

The value of the norm is found using the magnitude of the Bode plot.

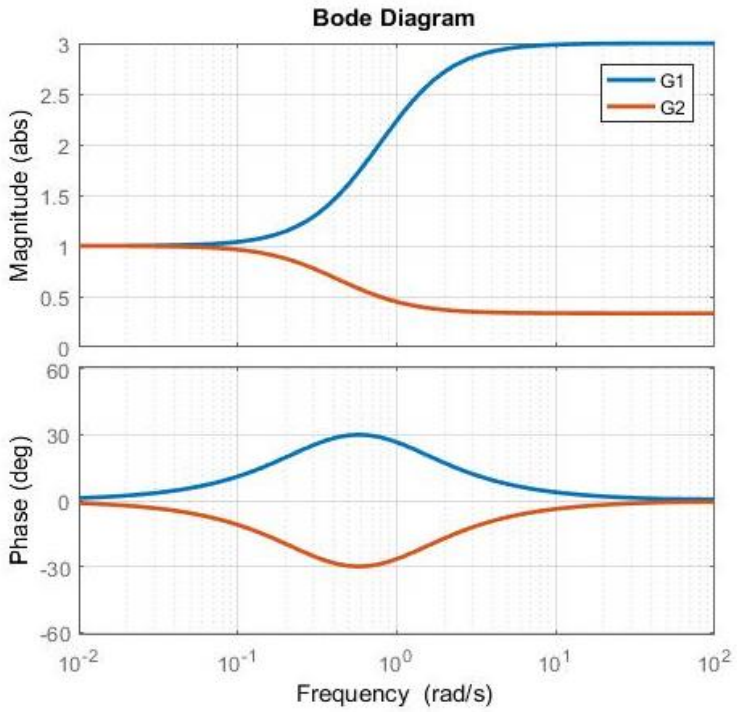
Using the following script:

```
close all, clear all, clc

% Norm of a Signal:
s = tf('s');
G1 = (3*s+1)/(s+1);
G2 = (s+1)/(3*s+1);
G1_norm = norm(G1, inf);
G2_norm = norm(G2, inf);

G1_norm , G2_norm
bode(G1, G2)
```

then obtain the following results:

$$\|G(s)_1\|_{\infty} = 3, \|G(s)_2\|_{\infty} = 1.$$

We can also show the Bode plot, but using the absolute scale of the magnitude to show the norms:



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