

# Frequency Domain Analysis (1A)

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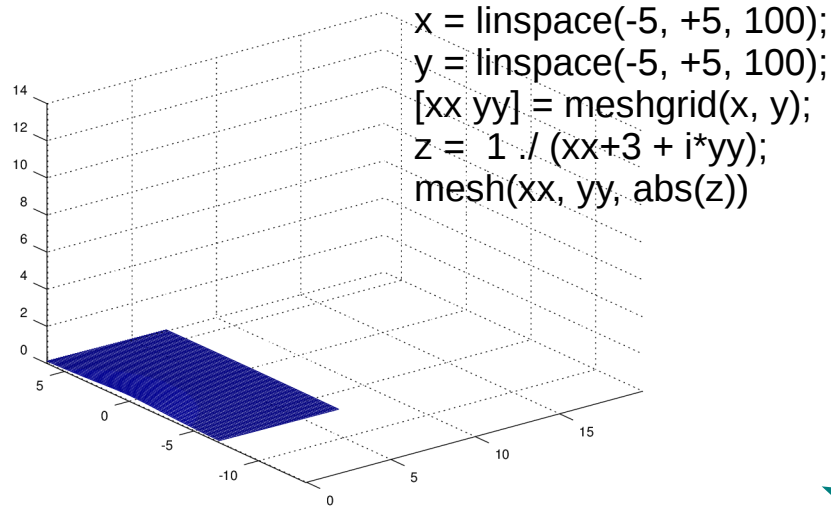
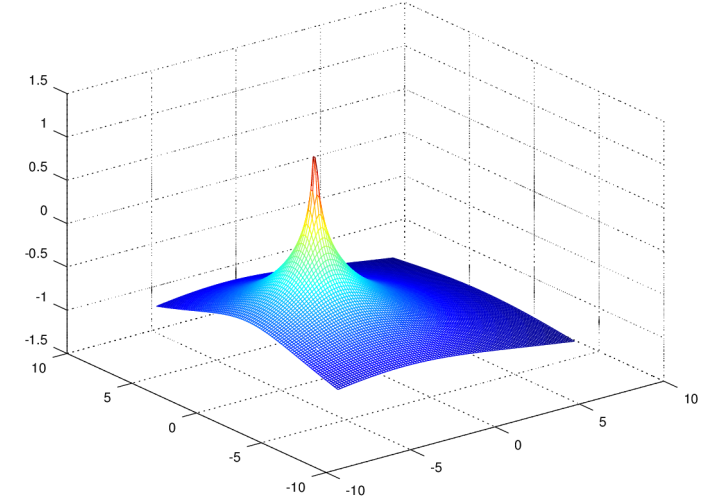
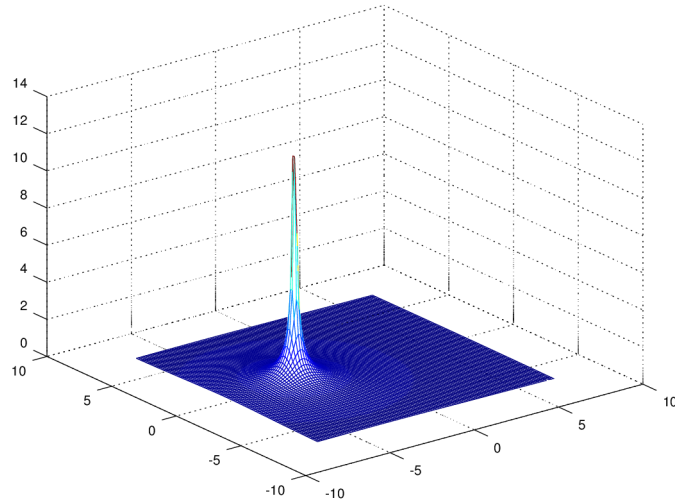
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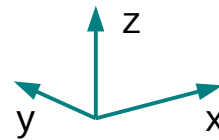
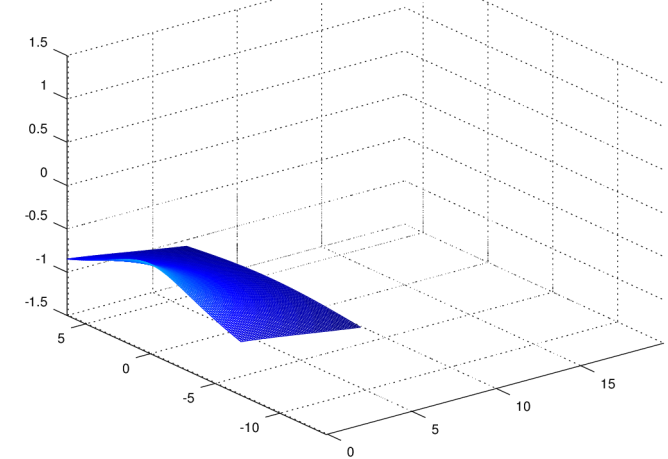
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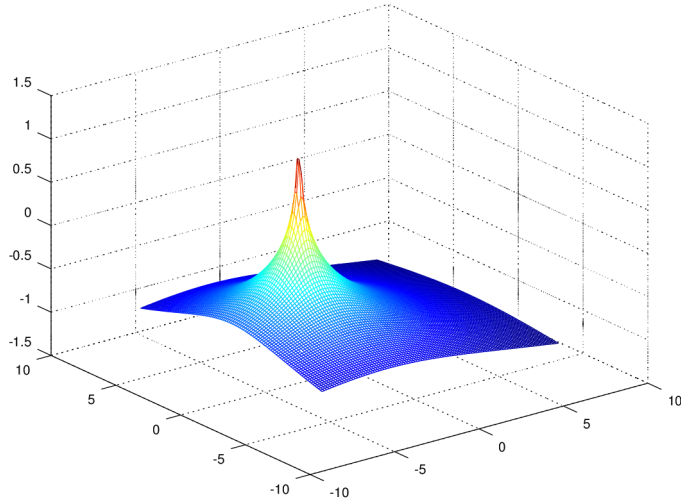
# Magnitude Response : $G(s) = 1 / (s + 3)$



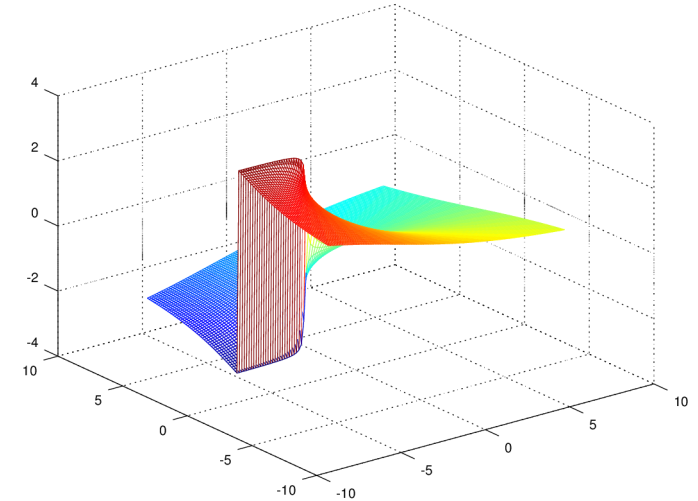
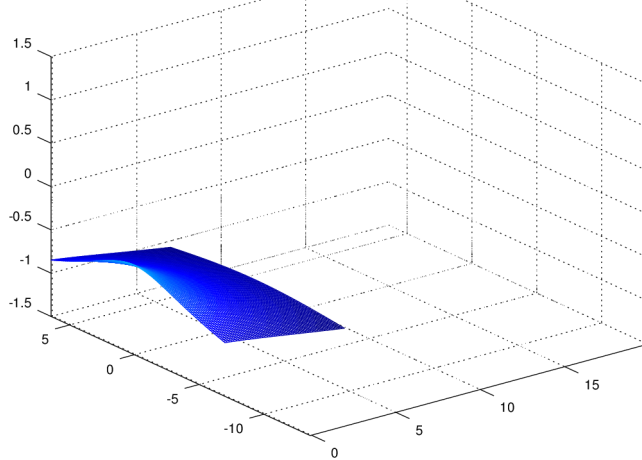
`mesh(xx, yy, log10( abs(z) ) )`



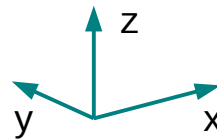
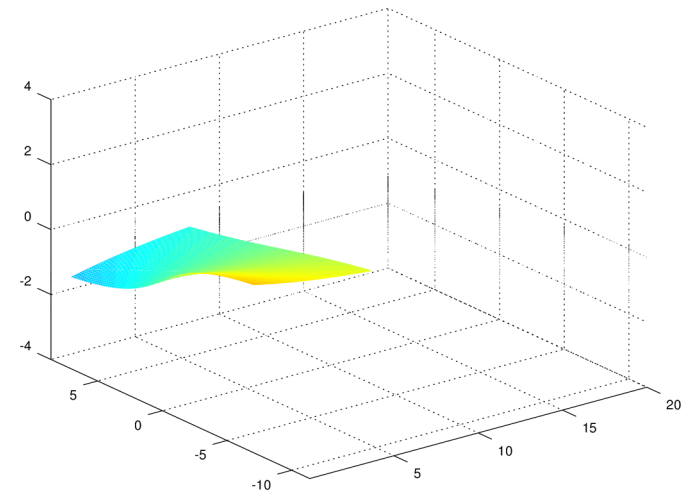
# Magnitude & Phase Response : $G(s) = 1 / (s + 3)$



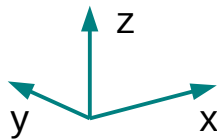
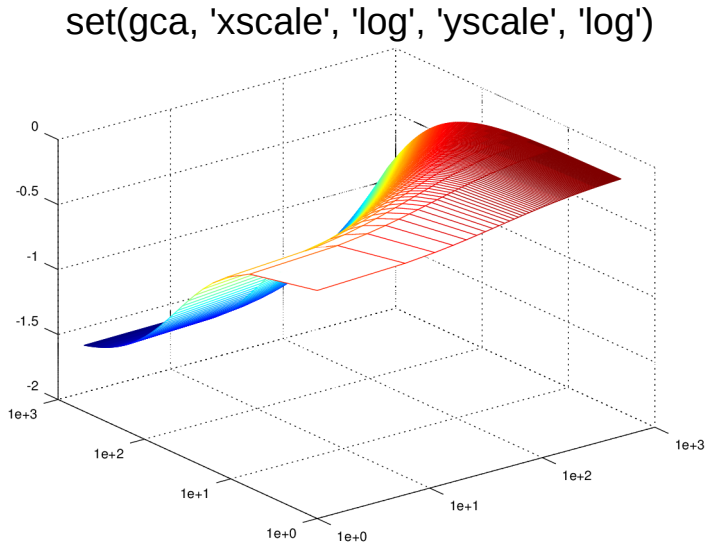
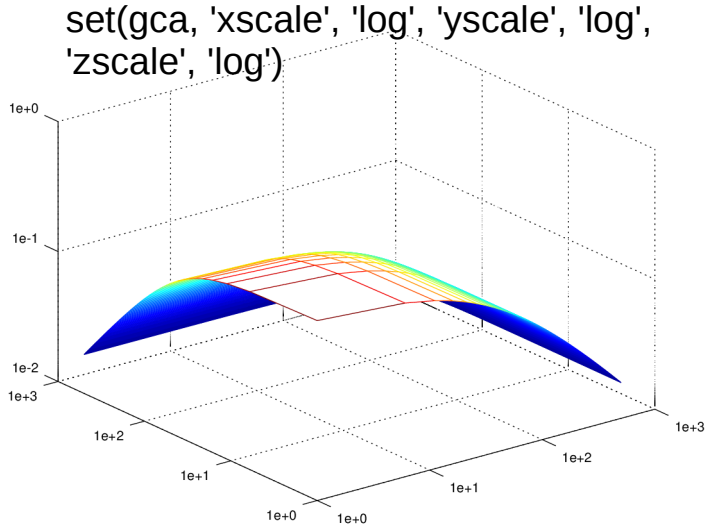
`mesh(xx, yy, log10( abs(z) ) )`



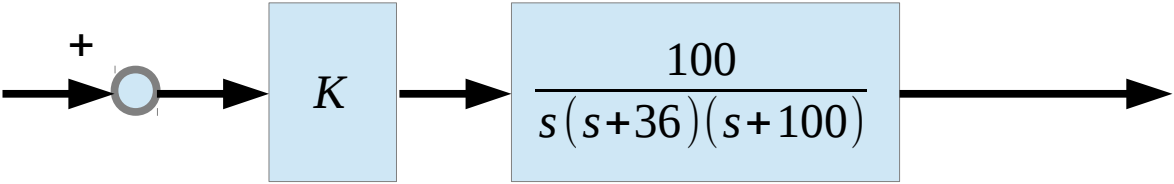
`mesh(xx, yy, arg(z) )`



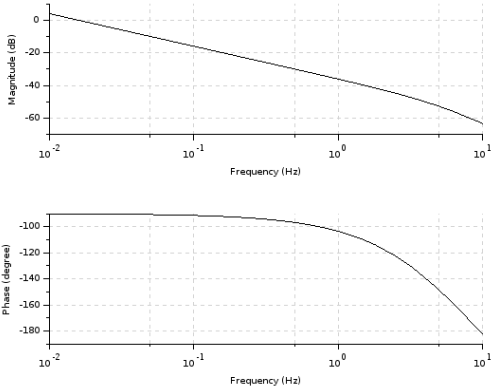
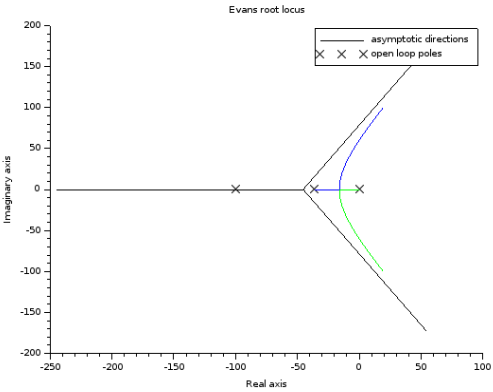
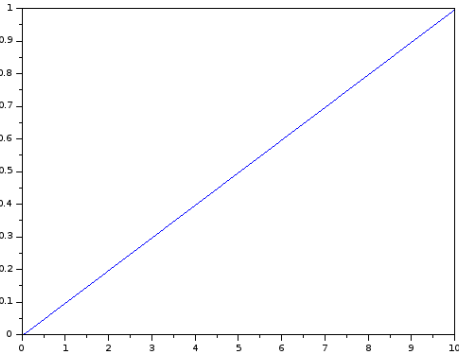
# Log-log Scale Response : $G(s) = 1 / (s + 3)$



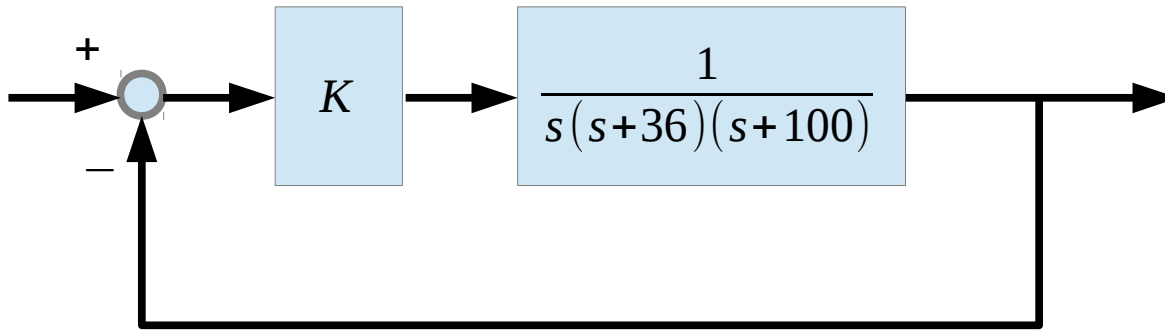
# Open Loop $G(S) = 100 / s(s+36)(s+100)$



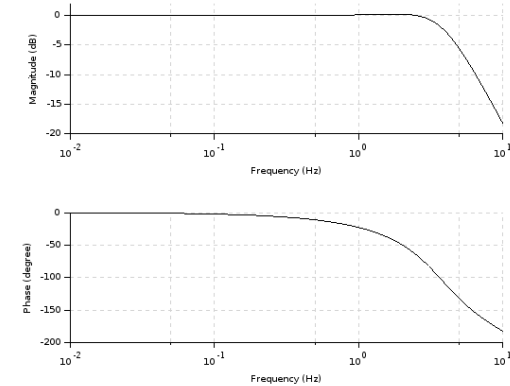
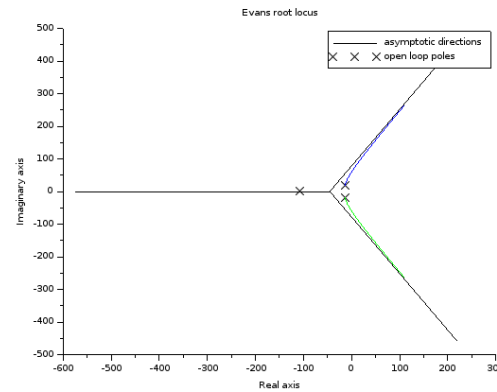
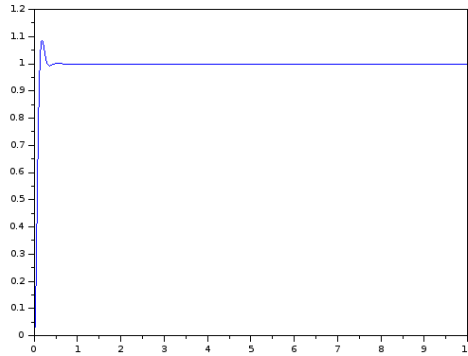
$K=3.6$



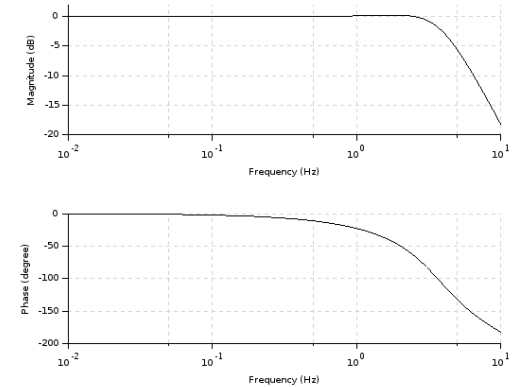
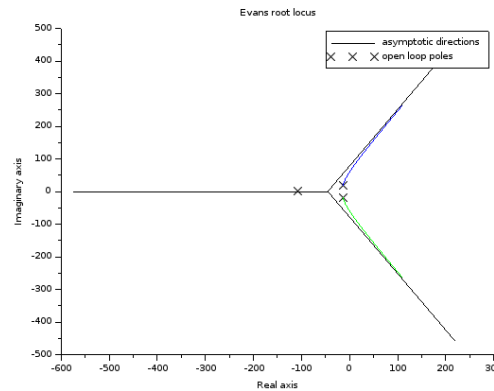
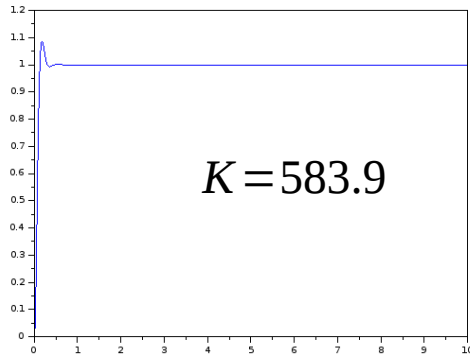
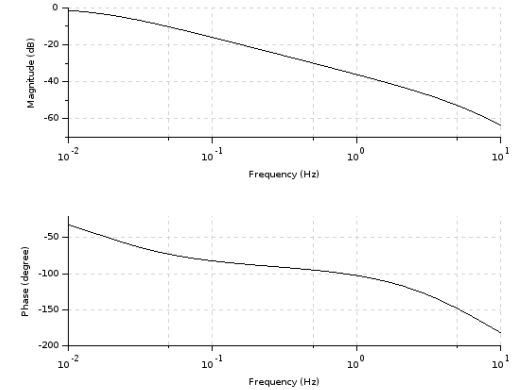
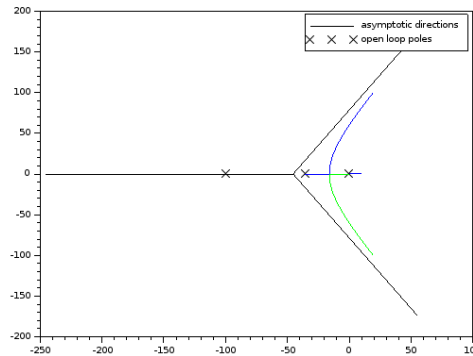
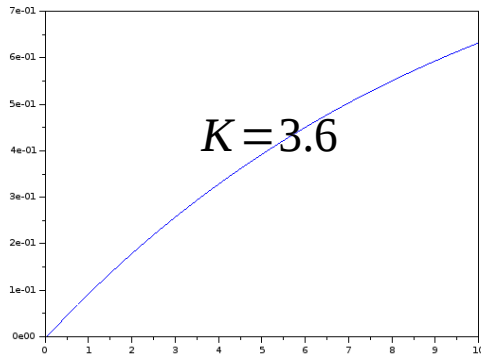
# Closed Loop $T(s) = KG(s) / (1+KG(s))$



$K = 583.9$



# Log-log Scale Response : $G(s) = 1 / (s + 3)$





# Scilab Code

```
K=3.6;
G = 100*K/(s*(s+36)*(s+100));
sys_ol = syslin('c', G);
t = 0:0.01:10;
y1 = csim('step', t, sys_ol);
plot(t, y1);
evans(y1);
bode(sys_ol, 0.01, 10);
```

```
K=583.9;
G = 100*K/(s*(s+36)*(s+100));
sys_cl = syslin('c', G/(1+G));
t = 0:0.01:10;
y1 = csim('step', t, sys_cl);
plot(t, y1);
evans(y1);
bode(sys_cl, 0.01, 10);
```

## References

- [1] <http://en.wikipedia.org/>
- [2] M.L. Boas, “Mathematical Methods in the Physical Sciences”
- [3] E. Kreyszig, “Advanced Engineering Mathematics”
- [4] D. G. Zill, W. S. Wright, “Advanced Engineering Mathematics”