The System function of a causal LTI system is given by

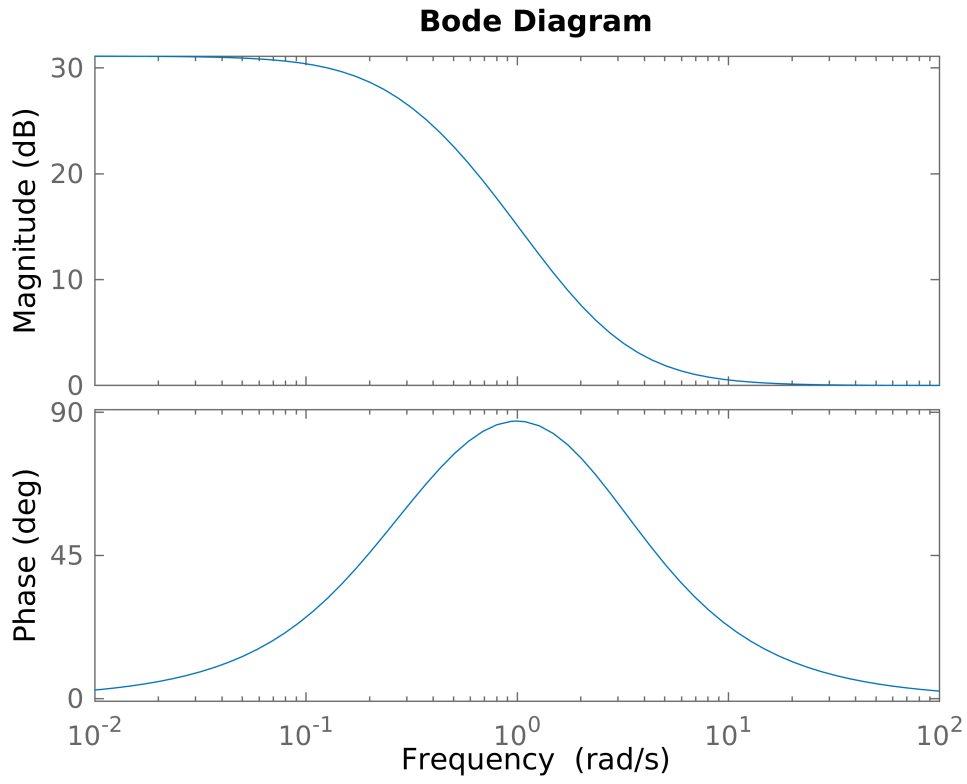
$$H(z) = \frac{(1-2z^{-1})(1-3z^{-1})}{(1-\frac{2}{3}z^{-1})(1-\frac{1}{4}z^{-1})}$$

a- plot the magnitude, the phase, and the group delay of $H(e^{j\omega})$.

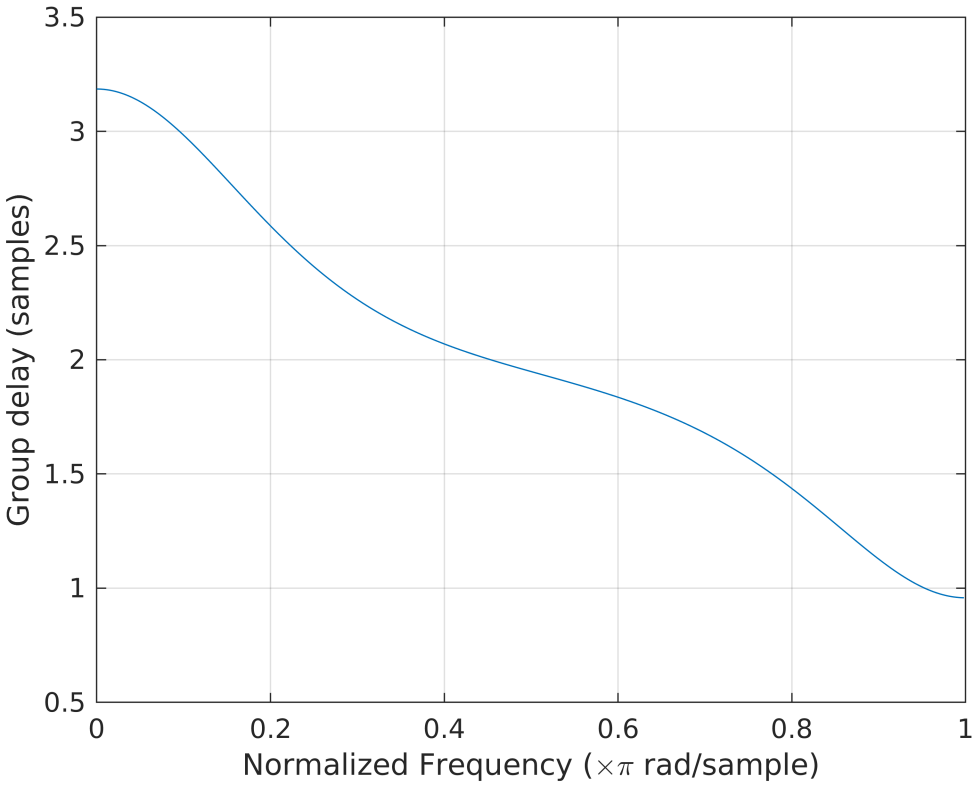
```
z = -5:0.1:5;
H = tf([12 -60 72],[12 -11 2]) %transfer function if you get rid of all the inverses
```

```
H =

  12 s^2 - 60 s + 72
  ------------------
  12 s^2 - 11 s + 2

Continuous-time transfer function.
```

```
bode(H) % plot the magnitude and phase plots
```




```
[sos, g] = tf2sos([12 -60 72],[12 -11 2]);
grpdelay(sos,128) %plot the group delay with 128 data points
```


3.5
3
2.5
2
1.5
1
0.5
Group delay (samples)
0
0.2
0.4
0.6
0.8
1
Normalized Frequency (×π rad/sample)