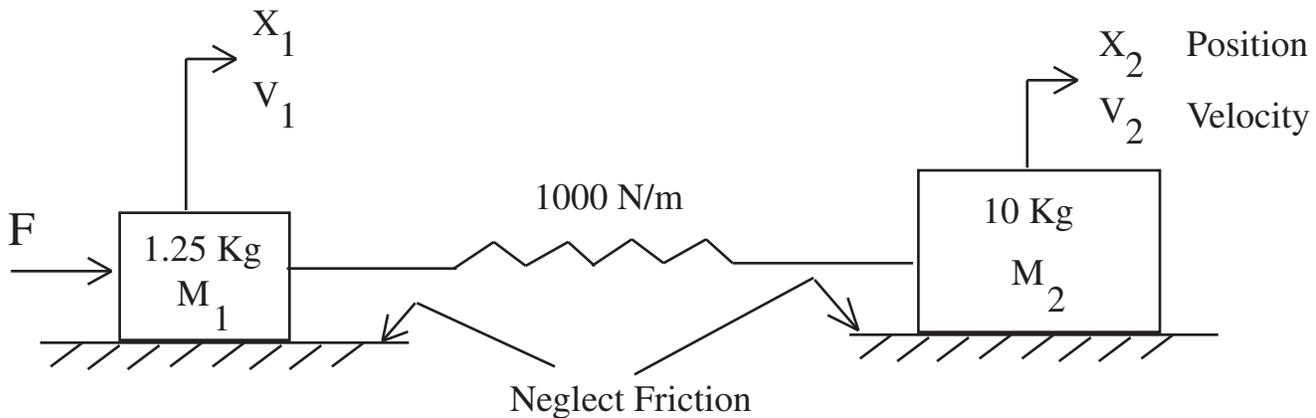


Question 1:

Draw the Pole-Zero diagram and Bode Plot of the following transfer functions:

$$\frac{X_1}{F} (S) \quad ; \quad \frac{V_2}{F} (S)$$

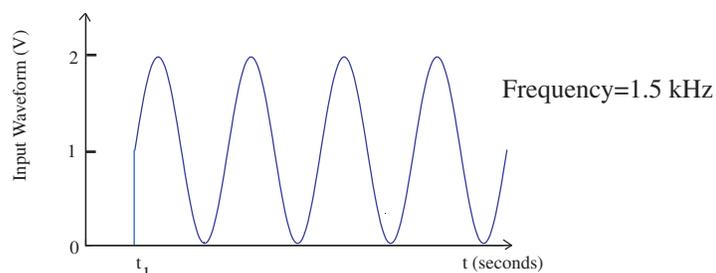
Question 2:

The Bode plot of a certain system (for a chosen input and output) is as shown on Page 2. We used log scale for plotting magnitude and frequency, and linear scale for plotting phase. The values corresponding to the magnitude plot have not been marked. We need to deduce them from our measurements.

We go back to our system and find that for an input sinusoidal waveform of frequency 1.84 Hz, the output is also a sinusoidal waveform having the same frequency, but with a magnitude 0.075 times that of the input, and phase difference ϕ .

Given this information, answer the following questions. State any assumptions that you make.

- 1) What is the value of ϕ ?
- 2) What transfer function describes our system? Mark the values of the magnitude response on the Bode Plot.
- 3) For the following waveform input to the system applied (starting at $t = t_1$) for a long time, sketch the output waveform as a function of time.



Bode Diagrams

