

Test 2
ME374 Winter 2027

1a) Construct the pole zero plot for the following transfer function

$$H(s) = \frac{s-1}{s^3+4s^2+5}$$

b) Sketch the Bode plot for the following transfer function

$$H(s) = \frac{9+s^2}{(1+s^2)(16+s^2)s}$$

What is the phase for large frequencies? What is the phase for small frequencies?

c) Consider the transfer function below. Solve for v as a function of time when $F=0$ and $v(0) = 0$ and $\dot{v}(0) = 1$.

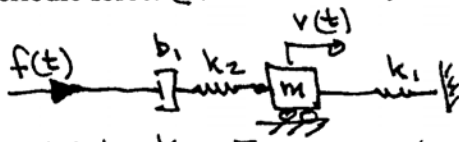
$$H(s) = \frac{v}{F} = \frac{1+s}{1+s}$$

d) If $H_1=1+3i$, $H_2=6e^{i\pi} + 4e^{i\pi/2}$ and $H_3 = \frac{H_1}{H_2} = Me^{i\phi}$.

Obtain M and ϕ (should be real numbers)

2)

Determine the steady state velocity response of the mass, $v(t)$, due to the shown periodic force. (Three terms)



$$m=1, k_1=5, k_2=4, b_1=2$$

