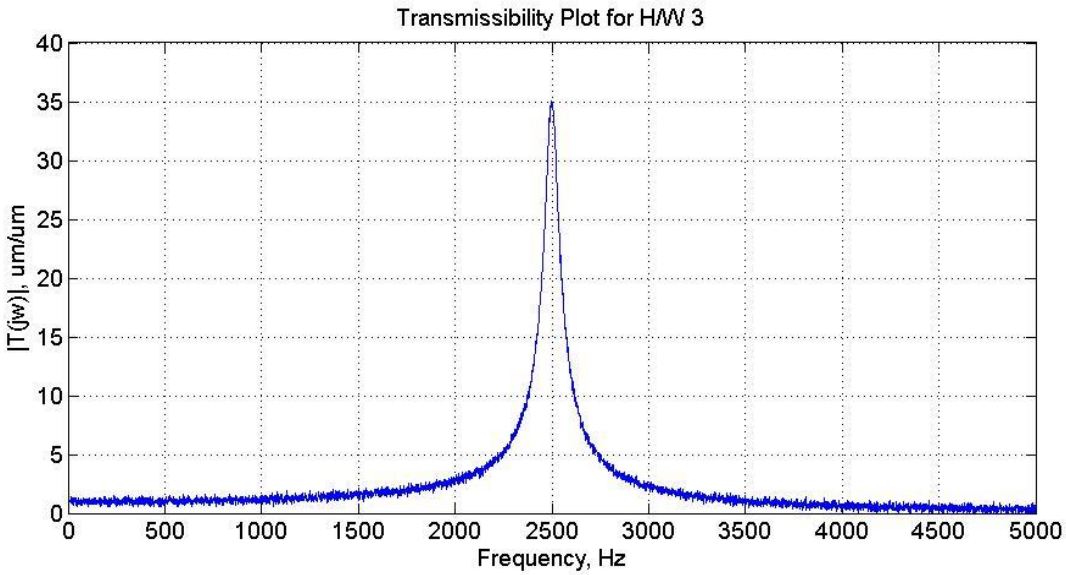
Homework Assignment #3 ELEC 5760/6760 Due: Wednesday 9/14/22

1) Consider the transmissibility plot for a MEM device with a 100 µg proof mass shown below:



a. What is the Q?
b. What is the damping ratio?
c. What is the natural frequency in kHz?
d. What is the spring constant?
e. What is the damping coefficient?
f. If the device is excited with a sinusoidal input at its natural frequency with an amplitude of 0.2 µm, what is the amplitude of the proof mass displacement at that frequency?
g. For the input in (f), what is the maximum acceleration experienced by the proof mass, in G's [1G = 9.8 m/s^2]?
h. What is the expression for T(s) for this device?
i. Using Matlab with an m-file, plot $|T(j\omega)|$. Turn in your plot (in a similar format to the one above (it should look very similar, but with less noise)) AND your m-file.