Periodic 1. (Do not hand in)

The mass-spring-dashpot below has mass \( m = 2 \) kg, stiffness \( k = 20000 \) N/m, and damping coefficient \( c = 40 \) Ns/m. Write the response of the system below excited by the periodic force given below, for which \( F_0 = 4\pi \) N and \( T = \pi/25 \) seconds. Is there a resonance? Compare the amplitudes of the first three Fourier terms in the response solution.

Periodic 2 (Hand in)

The mass-spring-dashpot below has mass \( m = 4 \) kg, stiffness \( k = 10000 \) N/m, and damping coefficient \( c = 20 \) Ns/m. What are the three most dangerous resonances (values of \( \omega \))? The base excitation response can be written in terms of an absolute coordinate \( x \) and a relative coordinate \( z = x - y \). Write and compare the first three Fourier amplitudes \( X_i \) for the \( x \) coordinate and \( Z_i \) for the \( z \) coordinate, for each of the three resonance cases.