

Forced Vibrations, Frequency Response, and Resonance (4.6)

1. A mass that weighs 8 lb stretches a spring 24 in. The system is acted on by a downward external force of $4\sin 4t$ lb. If the mass is pulled down 6 in. and then released, determine the position of the mass at any time. Determine the first four times at which the velocity of the mass is zero.

2. A spring-mass system has a spring constant of 3 N/m, A mass of 2 kg is attached to the spring, and the motion takes place in a viscous fluid that offers a resistance numerically equal to the magnitude of the instantaneous velocity. If the system is driven by a downward external force of $(12 \cos 3t - 8 \sin 3t)$ N, determine the steady-state response.