

EE 2240
Problem #13

For the system described by $\ddot{x} + 12\dot{x} + 32x = 0$:

- a. Determine the characteristic equation.
- b. Determine the natural frequency, ω_n .
- c. Determine the damping ratio, ζ .
- d. Determine the numerical values of the two roots of the characteristic equation.
- e. Classify the system as *overdamped*, *critically damped*, *underdamped*, or *undamped*.
- f. Assuming $x(0) = 8$ and $\dot{x}(0) = -44$, determine the solution of the given equation.