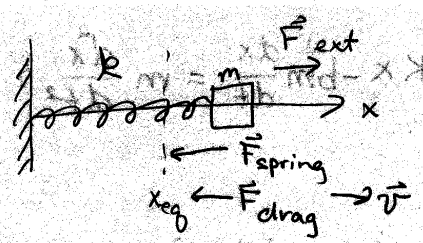
5)




a Degree of Freedom variable is $x(t)$

equation of motion:

$$\Sigma F = ma$$

$$F_{spring} + F_{drag} + F_{ext} = ma$$

$$-k(x - x_{eq}) - cm\frac{d^4x}{dt^4} + F_0\cos(\omega t) = \frac{md^2x}{dt^2}$$

Assume that the oscillations are harmonic with angular frequency equal to the one of the Driving force ($\omega$)

Guess solution in complex representation $x(t) = x_{eq} + Re\left[\underline{A}e^{i\omega t}\right]$

$$\dot{x}(t) = Re\left[i\omega\underline{A}e^{i\omega t}\right]$$

$$\ddot{x}(t) = Re\left[-\omega^2\underline{A}e^{i\omega t}\right]$$

$$\dddot{x}(t) = Re\left[-i\omega^3\underline{A}e^{i\omega t}\right]$$

$$\ddddot{x}(t) = Re\left[\omega^4\underline{A}e^{i\omega t}\right]$$