7.

Again, $\frac{b^2}{2m}$ is small for most physical systems and $\frac{A}{B} \approx 1$.

Therefore, when the system vibrates at $\omega = \omega_1$

$A \approx -B$ and $x_1(t)x - x_2(t) \approx x(t)$

$$x(t) \approx Ae^{-b/2m\ t} \cos\left(\sqrt{-b^2 + 4km}\ t + \theta\right),$$

and when the system vibrates at its other natural frequency,

$A \approx B$ and $x_1(t) \approx x_2(t) \times x(t)$

$$x(t) = Ae^{-b/2m\ t} \cos\left(\sqrt{-b^2 + 4(k + 2k_c)m}\ t + \theta\right).$$

In actuality, the system might vibrate at either of these frequencies or possibly some combination of the two, depending on the conditions which caused the vibration. That is, the vibratory mode is fixed by the initial conditions.

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