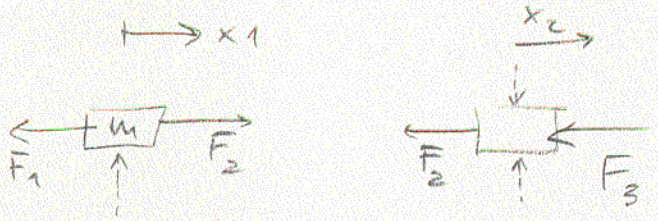
~~1~~ ~~2~~ 2

a)



①

$F_1 = c \cdot x_1 \qquad F_2 = 2c(x_2 - x_1) \qquad F_3 = c \cdot x_2$ ①

① $\begin{cases} m\ddot{x}_1 + cx_1 - 2c(x_2 - x_1) = 0 \\ m\ddot{x}_2 + 2c(x_2 - x_1) + cx_2 = 0 \end{cases}$

b)

$x_1 = A e^{\lambda t}$

$x_2 = B e^{\lambda t}$

① $\begin{bmatrix} m\lambda^2 + 3c & -2c \\ -2c & m\lambda^2 + 3c \end{bmatrix} \begin{Bmatrix} A \\ B \end{Bmatrix} = \underline{0}$

$m^2\lambda^4 + 6cm\lambda^2 + 9c^2 - 4c^2 = 0$

$\lambda^4 + 6\frac{c}{m}\lambda^2 + 5\left(\frac{c}{m}\right)^2 = 0$ ①

$\lambda^2 = \mu$

$\mu_{1/2} = -3\frac{c}{m} \pm \sqrt{9-5}\,\frac{c}{m}$ ①

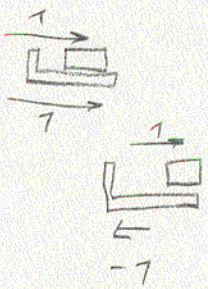
$= (-3 \pm 2)\frac{c}{m}$

c)

① $\begin{cases} \omega_1 = \sqrt{\frac{c}{m}} \\ \omega_2 = \sqrt{5\frac{c}{m}} \end{cases}$ $\begin{cases} \mu_1 = -\frac{c}{m} \\ \mu_2 = -5\frac{c}{m} \end{cases}$ ① $\begin{cases} \lambda_{1/2} = \pm i\sqrt{\frac{c}{m}} \\ \lambda_{3/4} = \pm i\sqrt{5\frac{c}{m}} \end{cases}$ ①

Eigenvektor 1: $2cA - 2cB = 0 \quad \underline{A = B}$

2: $-2cA - 2cB = 0 \quad \underline{A = -B}$



①