略解

演習問題１

$$\begin{cases} x_1(t) = d\sin\left(\omega_2 t + \dfrac{\pi}{2}\right) = d\cos\omega_2 t \\ x_2(t) = -d\sin\left(\omega_2 t + \dfrac{\pi}{2}\right) = -d\cos\omega_2 t \end{cases}$$

演習問題２

固有値：$\lambda_1 = -2,\ \ \lambda_2 = -6.$

固有ベクトル：$\boldsymbol{v}_1 = \begin{bmatrix} \dfrac{1}{\sqrt{2}} \\ \dfrac{1}{\sqrt{2}} \end{bmatrix},\ \ \boldsymbol{v}_2 = c_2 \begin{bmatrix} \dfrac{1}{\sqrt{2}} \\ -\dfrac{1}{\sqrt{2}} \end{bmatrix}$

演習問題３

$$\begin{cases} x_1(t) = -\dfrac{1}{2\sqrt{2}}\sin\sqrt{2}t - \dfrac{1}{10\sqrt{6}}\sin\sqrt{6}t + \dfrac{3}{5}\sin t \\ x_2(t) = -\dfrac{1}{2\sqrt{2}}\sin\sqrt{2}t + \dfrac{1}{10\sqrt{6}}\sin\sqrt{6}t + \dfrac{2}{5}\sin t \end{cases}$$