Question

Consider the problem

$$\frac{d^2\mathbf{x}}{dt^2} = M\mathbf{x}$$

where

$$M = \begin{pmatrix} 2 & -1 \\ -2 & 3 \end{pmatrix} \qquad \mathbf{x} = \begin{pmatrix} x \\ y \end{pmatrix}$$

By introducing two new variables write the problem as four first order differential equations and then express this in matrix form.

Using the new form of the problem find the general solution to the equation (∗)

Answer