

$$2. \quad \frac{dx}{dt} = x + 3y - 2t^2$$

$$\frac{dy}{dt} = 3x + y + t + 5$$

$$3. \quad \frac{dx}{dt} = x - 4y + 4t + 9e^{6t}$$

$$\frac{dy}{dt} = 4x + y - t + e^{6t}$$

$$4. \quad X' = \begin{pmatrix} 4 & 1/3 \\ 9 & 6 \end{pmatrix} X + \begin{pmatrix} -3 \\ 10 \end{pmatrix} e^t$$

$$5. \quad X' = \begin{pmatrix} -1 & 5 \\ -1 & 1 \end{pmatrix} X + \begin{pmatrix} \sin t \\ -2\cos t \end{pmatrix}$$

Use variation of parameters to solve the given system

$$6. \quad \frac{dx}{dt} = 3x - 3y + 4$$

$$\frac{dy}{dt} = 2x - 2y - 1$$

$$7. \quad X' = \begin{pmatrix} 2 & -1 \\ 4 & 2 \end{pmatrix} X + \begin{pmatrix} \sin 2t \\ 2\cos t \end{pmatrix} e^{2t}$$

$$8. \quad X' = \begin{pmatrix} 0 & 2 \\ -1 & 3 \end{pmatrix} X + \begin{pmatrix} 2 \\ e^{-3t} \end{pmatrix}$$

$$9. \quad X' = \begin{pmatrix} 3 & 2 \\ -2 & -1 \end{pmatrix} X + \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$

$$10. \quad X' = \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix} X + \begin{pmatrix} \sec t \\ 0 \end{pmatrix}$$