LS5. Version A.

$$\mathbf{X}' = \begin{pmatrix} 1 & 1 \\ 0 & 2 \end{pmatrix} \mathbf{X}$$

$$\mathbf{A} = \begin{pmatrix} 1 & 1 \\ 0 & 2 \end{pmatrix}$$

$$0 = \det(\mathbf{A} - \lambda \mathbf{I}) = \begin{vmatrix} 1-\lambda & 1 \\ 0 & 2-\lambda \end{vmatrix} = (1-\lambda)(2-\lambda)$$

$$\lambda_1 = 1 \text{ insatt i } (\mathbf{A} - \lambda \mathbf{I})\mathbf{v} = \mathbf{0} \text{ ger } \begin{pmatrix} 1-1 & 1 \\ 0 & 2-1 \end{pmatrix} \mathbf{v} = \mathbf{0}$$

$$\mathbf{v}_1 = r_1 \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$\mathbf{X}_1 = e^{t} \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$\lambda_2 = 2$ insatt i $(\mathbf{A} - \lambda\mathbf{I})\mathbf{v} = \mathbf{0}$ ger $\begin{pmatrix} 1-2 & 1 \\ 0 & 2-2 \end{pmatrix}\mathbf{v} = \mathbf{0}$

$$\mathbf{v}_2 = r_2 \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$

$$\mathbf{X}_2 = e^{2t} \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$

Allmänna lösningen blir :

$$\mathbf{X} = c_1\mathbf{X_1} + c_2\mathbf{X}_2 = c_1 e^{t}\begin{pmatrix} 1 \\ 0 \end{pmatrix} + c_2 e^{2t}\begin{pmatrix} 1 \\ 1 \end{pmatrix} = \begin{pmatrix} e^{t} & e^{2t} \\ 0 & e^{2t} \end{pmatrix}\begin{pmatrix} c_1 \\ c_2 \end{pmatrix}$$