$$\Rightarrow A = \frac{\left(\frac{p(0)}{m} - x_0 \lambda_2\right)}{\lambda_1 - \lambda_2}, \quad B = \frac{\left(x(0)\lambda_1 - \frac{p(0)}{m}\right)}{\lambda_1 - \lambda_2}$$

$$x(t) = \frac{\frac{p(0)}{m} - x_0 \lambda_2}{\lambda_1 - \lambda_2} e^{\lambda_1 t} + \frac{\left(x(0)\lambda_1 - \frac{p(0)}{m}\right)}{\lambda_1 - \lambda_2} e^{\lambda_2 t}$$

$$p(t) = \left[m \lambda_1 \frac{\left(\frac{p(0)}{m} - x(0)\lambda_2\right)}{\lambda_1 - \lambda_2} e^{\lambda_1 t} + m \lambda_2 \frac{\left(x(0)\lambda_1 - \frac{p(0)}{m}\right)}{\lambda_1 - \lambda_2} e^{\lambda_2 t} \right] \times e^{\frac{\alpha}{m} t}$$

$$\Rightarrow \begin{pmatrix} x(t) \\ p(t) \end{pmatrix} = \begin{pmatrix} A \end{pmatrix} \begin{pmatrix} x(0) \\ p(0) \end{pmatrix}$$

Using <u>maple</u> it is simple to show that $\det A = 1$