10.2.6.

$$\mathbf{X}' = \mathbf{AX}, \quad \mathbf{X}(0) = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$

$$\mathbf{A} = \begin{pmatrix} 2 & 4 \\ -1 & 6 \end{pmatrix}, \quad \mathbf{X}(t) = c_1 \begin{pmatrix} 2 \\ 1 \end{pmatrix} e^{4t} + c_2 \begin{pmatrix} 2 \\ 1 \end{pmatrix} te^{4t} + \begin{pmatrix} 1 \\ 1 \end{pmatrix} e^{4t}$$
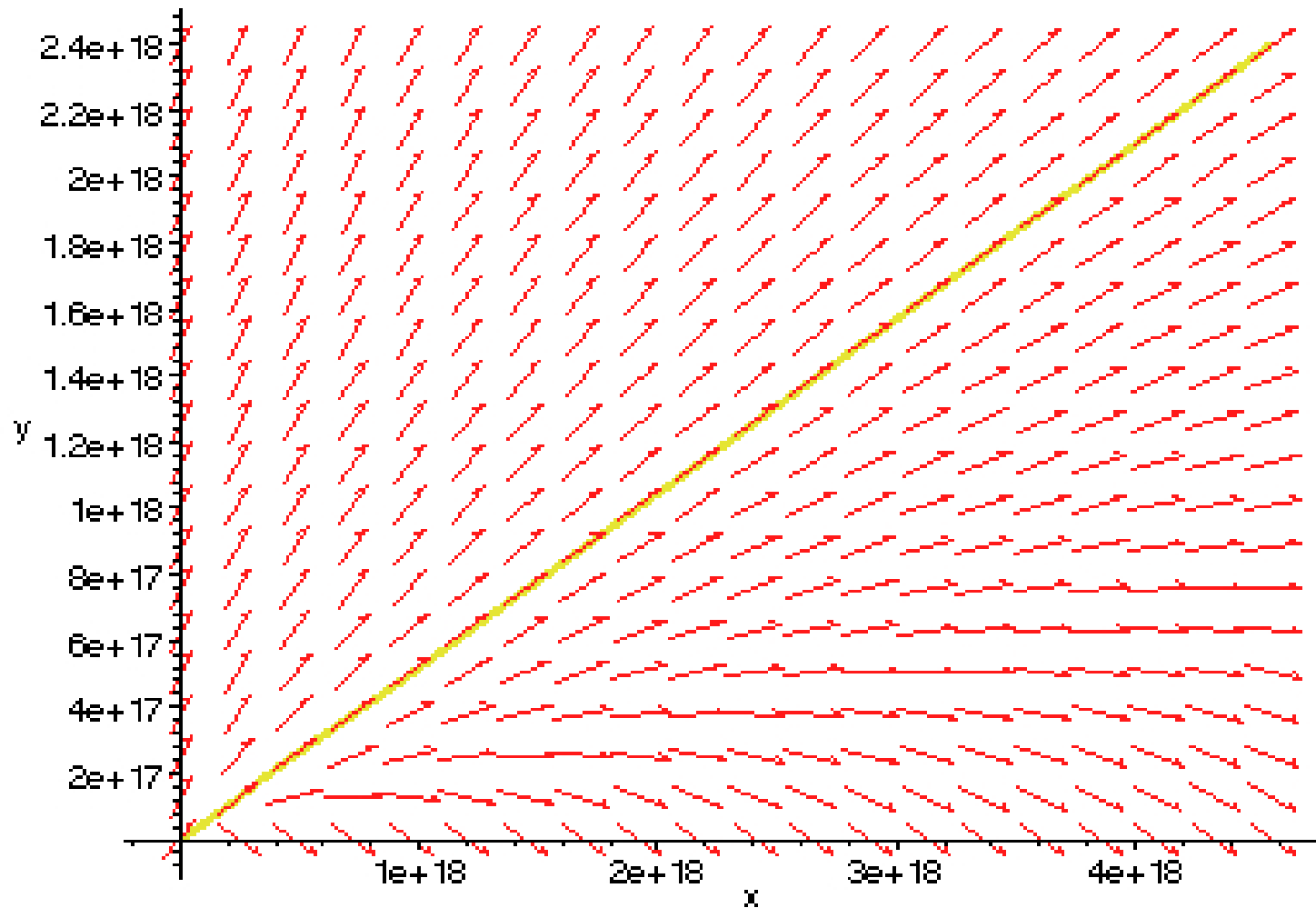
$$\begin{pmatrix} 1 \\ 1 \end{pmatrix} = \mathbf{X}(0) = c_1 \begin{pmatrix} 2 \\ 1 \end{pmatrix} + c_2 \begin{pmatrix} 1 \\ 1 \end{pmatrix} \qquad \begin{pmatrix} c_1 \\ c_2 \end{pmatrix} = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$

$$\mathbf{X}(t) = \begin{pmatrix} 2 \\ 1 \end{pmatrix} te^{4t} + \begin{pmatrix} 1 \\ 1 \end{pmatrix} e^{4t}$$

> with(DEtools):
>DEplot([diff(x(t),t)=2*x(t)+4*y(t),diff(y(t),t)=6*y(t)-x(t)],[x(t),y(t)],t=0..10,[[x(0)=1,y(0)=1]],stepsize=.2);

> with(DEtools):
>DEplot([diff(x(t),t)=2*x(t)+4*y(t),diff(y(t),t)=6*y(t)-
x(t)],[x(t),y(t)],t=0..7,x=-1..1,y=-1..1,stepsize=.2);