

# 10.2.4.

$$\mathbf{X} = \begin{pmatrix} -1 & -4 \\ 1 & -1 \end{pmatrix} \mathbf{X}$$

$$\mathbf{X}(t) = e^{-t} \left( c_1 \begin{pmatrix} 2 \cos 2t \\ \sin 2t \end{pmatrix} + c_2 \begin{pmatrix} -2 \sin 2t \\ \cos 2t \end{pmatrix} \right)$$

$$\text{Villkor: } \mathbf{X}(0) = \begin{pmatrix} 1 \\ 1 \end{pmatrix}.$$

$$\begin{pmatrix} 1 & 2 & 0 \\ 1 & 0 & 1 \end{pmatrix} \mathbf{C}, \quad \mathbf{C} = \begin{pmatrix} 1/2 \\ 1 \end{pmatrix}$$

$$\mathbf{X}(t) = e^{-t} \begin{pmatrix} \cos 2t - 2 \sin 2t \\ \frac{\sin 2t}{2} + \cos 2t \end{pmatrix}$$

$$\text{Determinanten} = 5.$$

$$\text{Spåret } \tau = -2.$$

$$\tau^2 - 4 = 4 - 20 = -16 < 0.$$

Komplexa egenvärden.

$$\tau = -2 \quad 0 \quad \text{Spiral.}$$

$$\tau < 0 \quad \text{Stabil spiral.}$$

```
plot([(cos(2*t)-2*sin(2*t))*exp(-t),  
(1*sin(2*t)/2+cos(2*t))*exp(-t), t=0..10]);
```

