

```
> with(LinearAlgebra) :
> P := Matrix([[0, 2, 1], [1, 1, -1], [0, 1, 1]]);
```

$$P := \begin{bmatrix} 0 & 2 & 1 \\ 1 & 1 & -1 \\ 0 & 1 & 1 \end{bmatrix} \quad (1)$$

```
> PP := MatrixInverse(P);
```

$$PP := \begin{bmatrix} -2 & 1 & 3 \\ 1 & 0 & -1 \\ -1 & 0 & 2 \end{bmatrix} \quad (2)$$

```
> B := Matrix([[2, 0, 0], [0, 1, 0], [0, 0, -1]]);
```

$$B := \begin{bmatrix} 2 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -1 \end{bmatrix} \quad (3)$$

```
> A := P • B • PP;
```

$$A := \begin{bmatrix} 3 & 0 & -4 \\ -4 & 2 & 7 \\ 2 & 0 & -3 \end{bmatrix} \quad (4)$$

```
> Eigenvectors(A);
```

$$\begin{bmatrix} 2 \\ 1 \\ -1 \end{bmatrix}, \begin{bmatrix} 0 & 2 & 1 \\ 1 & 1 & -1 \\ 0 & 1 & 1 \end{bmatrix} \quad (5)$$

```
> with(plots) :
> x11 := 0.5 • exp(2 • t); x12 := 0.5 • exp(t); x13 := 10 • exp(-t); x21 := -0.5 • exp(2 • t); x22 := -0.5 • exp(t); x23 := 10 • exp(-t); x31 := 0.5 • exp(2 • t); x32 := 0.5 • exp(t); x33 := -10 • exp(-t); x41 := -0.5 • exp(2 • t); x42 := -0.5 • exp(t); x43 := -10 • exp(-t);
```

$$\begin{aligned} x11 &:= 0.5 e^{2t} \\ x12 &:= 0.5 e^t \\ x13 &:= 10 e^{-t} \\ x21 &:= -0.5 e^{2t} \\ x22 &:= -0.5 e^t \\ x23 &:= 10 e^{-t} \\ x31 &:= 0.5 e^{2t} \\ x32 &:= 0.5 e^t \\ x33 &:= -10 e^{-t} \\ x41 &:= -0.5 e^{2t} \end{aligned}$$

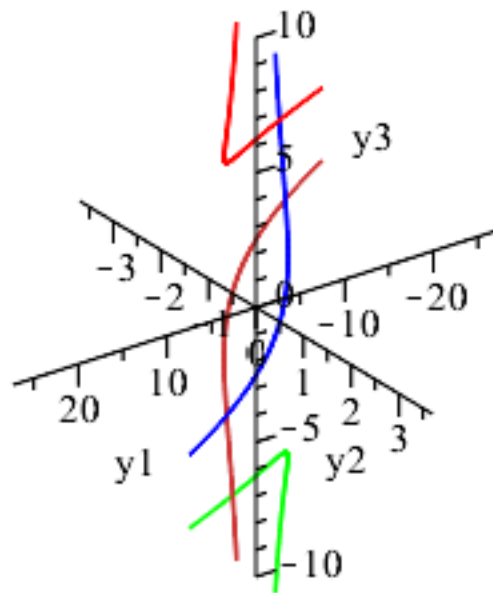
$$x42 := -0.5 e^t$$

$$x43 := -10 e^{-t}$$

(6)

```
> F1 := spacecurve([x11, x12, x13], t=0..2, axes=normal, color=blue, orientation=[54, 64],  
labels=["y1", "y2", "y3"]) : F2 := spacecurve([x21, x22, x23], t=0..2, axes=normal,  
color=red, orientation=[54, 64], labels=["y1", "y2", "y3"]) : F3 := spacecurve([x31,  
x32, x33], t=0..2, axes=normal, color=green, orientation=[54, 64], labels=["y1", "y2",  
"y3"]) : F4 := spacecurve([x41, x42, x43], t=0..2, axes=normal, color=orange,  
orientation=[54, 64], labels=["y1", "y2", "y3"]) :
```

```
> display({F1, F2, F3, F4});
```



```
> Ds := Matrix([[exp(2 t), 0, 0], [0, exp(t), 0], [0, 0, exp(-t)]]);
```

$$Ds := \begin{bmatrix} e^{2t} & 0 & 0 \\ 0 & e^t & 0 \\ 0 & 0 & e^{-t} \end{bmatrix}$$

(7)

```
> P • Ds • PP;
```

$$\begin{bmatrix} 2e^t - e^{-t} & 0 & -2e^t + 2e^{-t} \\ -2e^{2t} + e^t + e^{-t} & e^{2t} & 3e^{2t} - e^t - 2e^{-t} \\ e^t - e^{-t} & 0 & -e^t + 2e^{-t} \end{bmatrix}$$

(8)

```
> latex(%);
\left[ \begin{array}{ccc} 2\,e^t - e^{-t} & 0 & -2\,e^t + 2\,e^{-t} \\ -2\,e^{2t} + e^t + e^{-t} & e^{2t} & 3\,e^{2t} - e^t - 2\,e^{-t} \\ e^t - e^{-t} & 0 & -e^t + 2\,e^{-t} \end{array} \right]
```

```
>
```