```
> # Problem 5.3-49
  # Eigenanalysis method for u'=Au.
> A:=<139,-14,-52,-14,28|-22,5,7,8,-7|370,-38,-139,-38,76|152,-16,
  -59,-13,35|95,-10,-38,-7,23>^+;
```

$$A := \begin{bmatrix} 139 & -14 & -52 & -14 & 28 \\ -22 & 5 & 7 & 8 & -7 \\ 370 & -38 & -139 & -38 & 76 \\ 152 & -16 & -59 & -13 & 35 \\ 95 & -10 & -38 & -7 & 23 \end{bmatrix} \tag{1}$$

```
> linalg[eigenvects](A);
```

$$\left[3, 1, \left\{\left[\begin{array}{ccccc} 1 & 7 & 1 & 1 & 1 \end{array}\right]\right\}\right], \left[6, 1, \left\{\left[\begin{array}{ccccc} 0 & 1 & 0 & 1 & 1 \end{array}\right]\right\}\right], \left[-3, 1, \left\{\left[\begin{array}{ccccc} 1 & 0 & 3 & 1 & 1 \end{array}\right]\right\}\right], \left[0, 1, \left\{\left[\begin{array}{ccccc} 0 & 3 & 0 & -1 & 1 \end{array}\right]\right\}\right], \left[9, 1, \left\{\left[\begin{array}{ccccc} 2 & 0 & 5 & 2 & 1 \end{array}\right]\right\}\right] \tag{2}$$

```
> u0:=<10,0,0,0,0>;
```

$$u0 := \begin{bmatrix} 10 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} \tag{3}$$

```
> LinearAlgebra[MatrixExponential](A,t).u0;
```

$$\begin{bmatrix} -100\,e^{-3t} - \frac{50}{3}\,e^{3t} + \frac{380}{3}\,e^{9t} \\ 95 - \frac{350}{3}\,e^{3t} + \frac{65}{3}\,e^{6t} \\ -300\,e^{-3t} - \frac{50}{3}\,e^{3t} + \frac{950}{3}\,e^{9t} \\ -\frac{95}{3} - 100\,e^{-3t} - \frac{50}{3}\,e^{3t} + \frac{65}{3}\,e^{6t} + \frac{380}{3}\,e^{9t} \\ \frac{95}{3} - 100\,e^{-3t} - \frac{50}{3}\,e^{3t} + \frac{65}{3}\,e^{6t} + \frac{190}{3}\,e^{9t} \end{bmatrix} \tag{4}$$