

```
> UseHardwareFloats:=false:
```

```
  Digits := 6:
```

```
  read("d:/343/ClearMatrix.mpl");
```

```
> A := LinearAlgebra:-RandomMatrix(4,4,generator=-5..5);
```

$$A := \begin{bmatrix} -5 & 0 & 1 & 0 \\ 1 & -4 & 0 & -5 \\ 1 & -2 & -2 & -4 \\ 5 & -1 & 1 & -5 \end{bmatrix}$$

(1)

```
> LinearAlgebra:-Eigenvalues(1.0*A);
```

$$\begin{bmatrix} -7.66328 + 0. I \\ -3.36259 + 2.22853 I \\ -3.36259 - 2.22853 I \\ -1.61181 + 0. I \end{bmatrix}$$

(2)

```
> LinearAlgebra:-Eigenvectors(1.0*A);
```

$$\begin{bmatrix} -7.66328 + 0. I \\ -3.36259 + 2.22853 I \\ -3.36259 - 2.22853 I \\ -1.61181 + 0. I \end{bmatrix},$$

(3)

```
[ [0.216971 + 0. I, 0.151921 - 0.153956 I, 0.151921 + 0.153956 I, 0.0696887 + 0. I],
```

```
[ -0.654810 + 0. I, 0.690950 + 0. I, 0.690950 - 0. I, -0.869082 + 0. I],
```

```
[ -0.577736 + 0. I, 0.591807 + 0.086491 I, 0.591807 - 0.086491 I, 0.236132 + 0. I],
```

```
[ -0.436319 + 0. I, -0.057710 - 0.338743 I, -0.057710 + 0.338743 I, 0.429046 + 0. I]]
```

```
> B := 1.0*A:
```

```
  for k from 1 to 100 do
```

```
    (Q,R) := LinearAlgebra:-QRDecomposition(B,fullspan):
```

```
    B := R.Q:
```

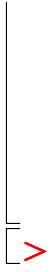
```
  end do:
```

```
> B;
```

$$\begin{bmatrix} -7.66294 & -5.79383 & 1.63522 & -2.05148 \\ 6.62355 \cdot 10^{-28} & -2.71604 & 4.05972 & -0.974800 \\ -7.01915 \cdot 10^{-29} & -1.32643 & -4.00945 & -0.768908 \\ 1.08562 \cdot 10^{-67} & -3.90158 \cdot 10^{-41} & 7.53567 \cdot 10^{-40} & -1.61179 \end{bmatrix}$$

(4)

```
> ClearMatrix(B,10.0^(-10));
```



$$\begin{bmatrix} -7.66294 & -5.79383 & 1.63522 & -2.05148 \\ 0. & -2.71604 & 4.05972 & -0.974800 \\ 0. & -1.32643 & -4.00945 & -0.768908 \\ 0. & 0. & 0. & -1.61179 \end{bmatrix}$$

(5)