

Some Linear Algebra Computations Using MATLAB

Enter Matrix

```
A = [3 2 2; 1 4 1; -2 -4 -1]
```

```
A = 3x3  
    3     2     2  
    1     4     1  
   -2    -4    -1
```

```
A = sym(A)
```

```
A =  

$$\begin{pmatrix} 3 & 2 & 2 \\ 1 & 4 & 1 \\ -2 & -4 & -1 \end{pmatrix}$$

```

Determinant

```
det(A)
```

```
ans = 6
```

Reduced Row Echelon Form

```
rref(A)
```

```
ans =  

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

```

Find and Factor Characteristic Polynomial

```
syms x  
P = charpoly(A,x)
```

```
P = x3 - 6x2 + 11x - 6
```

```
factor(P)
```

$$\text{ans} = (x - 3 \quad x - 1 \quad x - 2)$$

Finding Eigenvalues and Eigenvectors

`eig(A)`

ans =

$$\begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$$

`[V, D] = eig(A)`

V =

$$\begin{pmatrix} 0 & -1 & -2 \\ -1 & 0 & 1 \\ 1 & 1 & 0 \end{pmatrix}$$

D =

$$\begin{pmatrix} 3 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 2 \end{pmatrix}$$