

To print higher-resolution math symbols, click the **Hi-Res Fonts for Printing** button on the jsMath control panel.

tutorial 1

```
m=matrix([[1,2,2],[2,1,2],[2,2,1]])
```

m

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

```
m.submatrix(0,0,2,2)
```

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

```
m.eigenvalues()
```

```
[5, -1, -1]
```

```
eval, evec = m.eigenmatrix_right()
```

eval

```
[ 5  0  0]
[ 0 -1  0]
[ 0  0 -1]
```

```
eval[0,0]
```

```
5
```

```
eval[1,1]
```

```
-1
```

```
eval[2,2]
```

```
-1
```

evec

```
[ 1  1  0]
[ 1  0  1]
[ 1 -1 -1]
```

```
v1=evec.column(0)
```

```
v1
```

```
(1, 1, 1)
```

```
v2=evec.column(1);v2
```

```
(1, 0, -1)
```

```
v3=evec.column(2);v3
```

```
(0, 1, -1)
```

```
u=(1/sqrt(6))*matrix([[sqrt(2),sqrt(3),1],[sqrt(2),-sqrt(3),1],[sqrt(2),0,-2]])
```

```
u
```

```
[ 1/6*sqrt(2)*sqrt(6)  1/6*sqrt(3)*sqrt(6)      1/6*sqrt(6)]  
[ 1/6*sqrt(2)*sqrt(6) -1/6*sqrt(3)*sqrt(6)     1/6*sqrt(6)]  
[ 1/6*sqrt(2)*sqrt(6)           0             -1/3*sqrt(6)]
```

```
udag=u.transpose()
```

```
u*udag
```

```
[1 0 0]  
[0 1 0]  
[0 0 1]
```

```
udag*u
```

```
[1 0 0]  
[0 1 0]  
[0 0 1]
```

```
udag*m*u
```

```
[ 5  0  0]  
[ 0 -1  0]  
[ 0  0 -1]
```