

```
>> A=[7 4 4; 4 1 -8; 4 -8 1]
```

A =

```

7     4     4
4     1    -8
4    -8     1
```

```
>> A'-A
```

ans =

```

0     0     0
0     0     0
0     0     0
```

```
>> c=poly(A)
```

c =

```

1    -9   -81   729
```

```
>> roots(c)
```

ans =

```

-9.0000
 9.0000 + 0.0000i
 9.0000 - 0.0000i
```

```
>> rref(A+9*eye(3))
```

ans =

```

1.0000     0     0.5000
         0     1.0000    -1.0000
         0         0         0
```

```
>> rref(A-9*eye(3))
```

ans =

```

1     -2     -2
0      0      0
0      0      0
```

```
>>
```

```
>>
```

```
>> [P,D]=eig(A)
```

P =

```

0.3333    0.8944   -0.2981
-0.6667    0.4472    0.5963
-0.6667   -0.0000   -0.7454
```

$$A^T - A$$

A symmetric

$$\begin{aligned} \det(A - tI_3) &= \\ &= - (t^3 - 9t^2 - 81t + 729) \\ &= - (t+9)(t-9)^2 \end{aligned}$$

```
D =  
    -9     0     0  
     0     9     0  
     0     0     9  
  
>> P'*P  
ans =  
    1.0000    0.0000    0.0000  
    0.0000    1.0000    0.0000  
    0.0000    0.0000    1.0000  
  
>>
```

$$P^T P = I_3$$

P er orthogonal