In [3]:
```
import numpy as np
from sympy import symbols, Symbol, ones, eye, simplify
```

In [4]:
```
x,y,z = symbols('x y z')
```

In [5]:
```
f = 2*(x - y)**2 + (y - z)**2 - 2*x*z
f
```

Out[5]: $-2xz + 2(x - y)^2 + (y - z)^2$

In [6]:
```
fun = 2*x**2 + 3*y**2 + z**2 - 4*x*y - 2*y*z - 2*x*z
fun
```

Out[6]: $2x^2 - 4xy - 2xz + 3y^2 - 2yz + z^2$

In [7]:
```
a = 2
e = 3
k = 1
b_d = -4
f_h = -2
c_g = -2
```

In [8]:
```
A = np.array([
        [a, b_d/2, c_g/2],
        [b_d/2, e, f_h/2],
        [c_g/2, f_h/2, k]
    ], dtype=np.dtype(float))


print("Matrix A:")
print(A)
```

```
Matrix A:
[[ 2. -2. -1.]
 [-2.  3. -1.]
 [-1. -1.  1.]]
```

In [9]:
```
eigenvalues, eigenvectors = np.linalg.eig(A)
print("Eigenvalues", eigenvalues)
```

```
Eigenvalues [-0.71447874  4.57120142  2.14327732]
```

Konečný výsledek:

počet kladných vlastních čísel, počet záporných, počet nulových vlastních čísel

In [12]:
```
num_positive = np.sum(eigenvalues > 0)
num_negative = np.sum(eigenvalues < 0)
num_zero = np.sum(eigenvalues == 0)

print(num_positive, num_negative, num_zero)
```

```
2 1 0
```