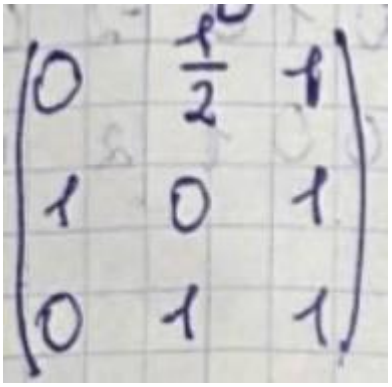
Part 1.

Eigenvalues and eigenvectors calculation for entered matrix.

For this execution I used a matrix from Homework 2.

```
Enter the size of the matrix: 3
Enter the matrix row numbers one by one(using space):
Row 1: -5 0 3
Row 2: -6 1 3
Row 3: -6 0 4

Eigenvector №1: A·v is equal to λ·v


Eigenvector №2: A·v is equal to λ·v


Eigenvector №3: A·v is equal to λ·v


Eigenvalues:
 [ 1. -2.  1.]

Eigenvectors:
 [[ 0.   1.   0.5]
 [ 1.   1.  -0. ]
 [ 0.   1.   1. ]]

Process finished with exit code 0
```

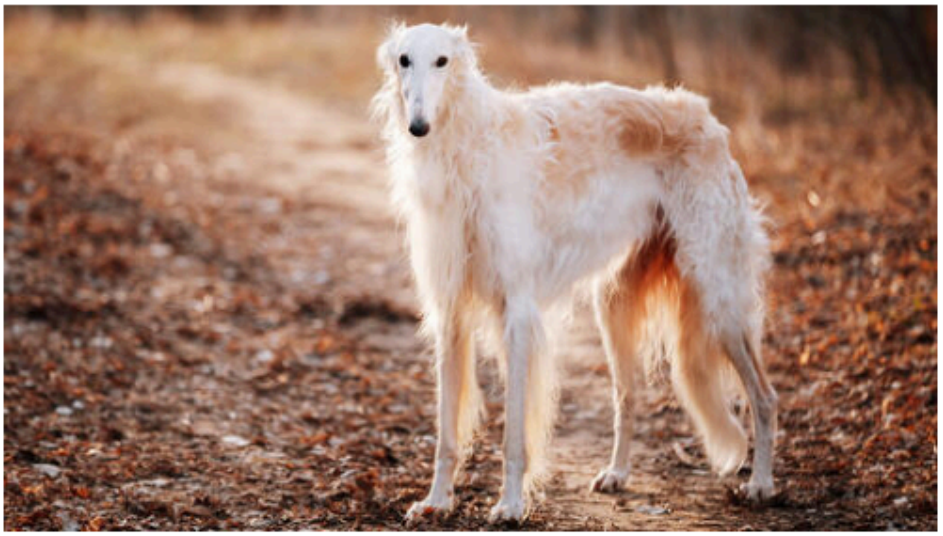
We can now check whether the result is true, according to my calculations in homework. We can see that the vectors are placed in different positions, but the calculations are true.



Part 2.

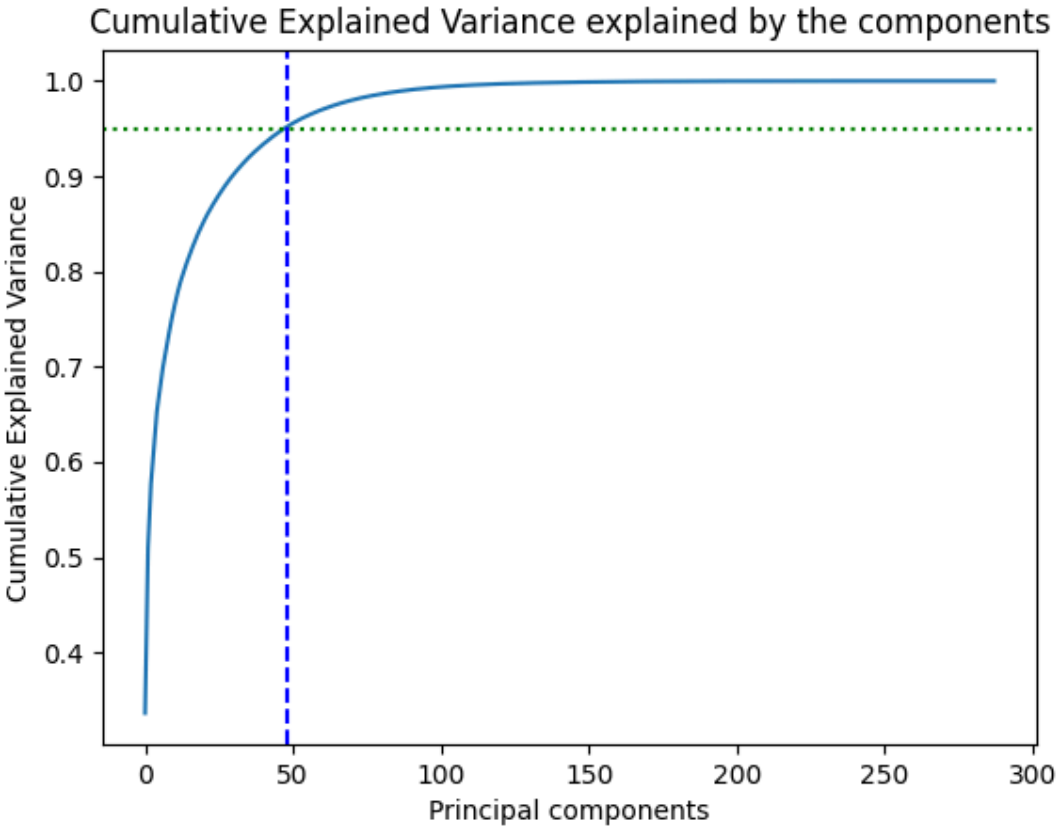
PCA Image Compression.

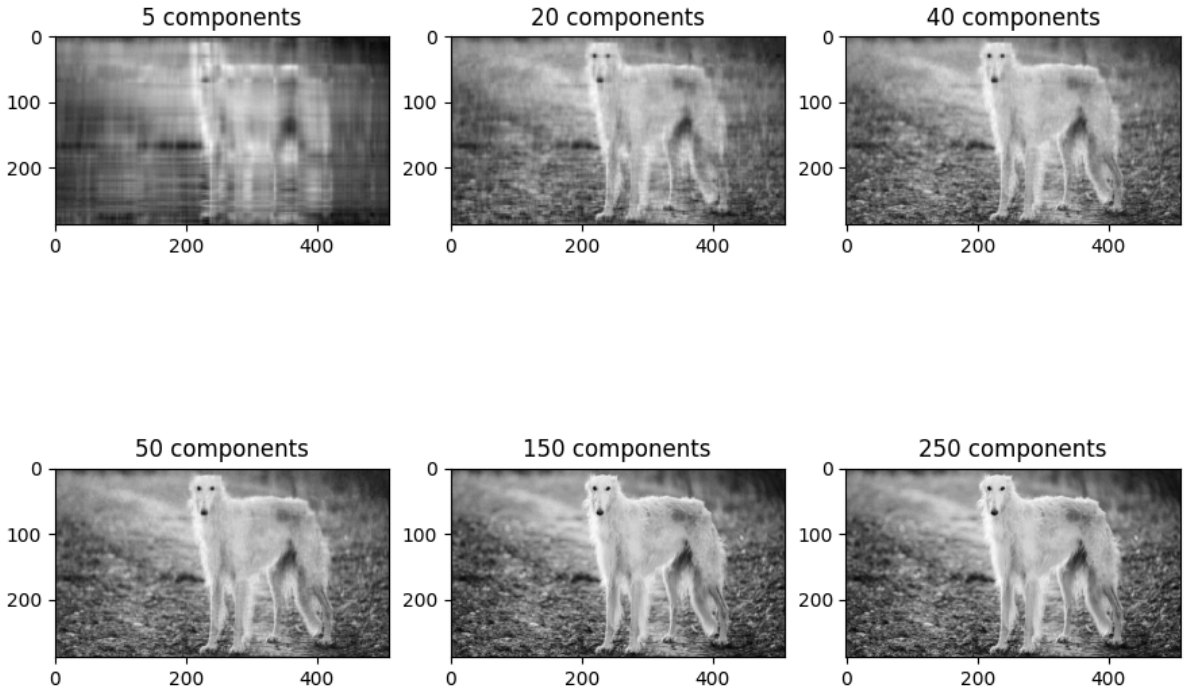
Original image of borzyi piesek



Black and white image of borzyi piesek

The graph for cumulative variance:






```
The size of the original piesek image(height, width):  (288, 510, 3)

The size of black and white piesek image(height, width):  (288, 510)

Number of components that cover 95% variance:  48

Process finished with exit code 0
```

Part 3.

Decryption of the message.

```
Original message:  SKIBIDI DOP DOP DOP YES YES

Encrypted message:  [241968.-3.09768064e-11j 288579.-5.45771230e-11j 242388.-4.69700563e-11j
 292038.-5.24864340e-11j 209533.-2.71758547e-11j 215067.-6.88797570e-11j
 217025.-4.70218059e-11j 217943.-6.43393672e-11j 240011.-3.97819692e-11j
 175976.-3.92377087e-11j 223682.-5.44537409e-11j 193262.-4.74917003e-11j
 256731.-7.08780409e-11j 246842.-3.93324364e-11j 210771.-4.81751960e-11j
 248081.-6.09591563e-11j 213982.-4.05518158e-11j 262749.-4.33453885e-11j
 211079.-3.89957334e-11j 248116.-6.50679492e-11j 241510.-6.05144093e-11j
 178786.-3.63068367e-11j 254125.-2.54741080e-11j 167500.-4.20260085e-11j
 239917.-5.13846979e-11j 265358.-6.76116793e-11j 240330.-3.85514529e-11j]

Decrypted message:  SKIBIDI DOP DOP DOP YES YES
```