

```

In[1]:= (* przetwarzanie jpg na macierz *)
zdjecieorg = Import["zdjecie5.jpg"];
zdjecieorg = ColorConvert[zdjecieorg, "Grayscale"];
zdjecie = ImageData[zdjecieorg];
If[Length[zdjecie] > 400, zdjecieorg = ImageResize[zdjecieorg, 400];
zdjecie = ImageData[zdjecieorg]];
dh = Length[zdjecie];
dv = Length[zdjecie[[1]]];
dl = Min[{dh, dv}]
th = Max[{Round[(dh - dl) / 2], 0}];
tv = Max[{Round[(dv - dl) / 2], 0}];
wybierz[A_, m_, n_, d_] := Table[Take[A[[i]], {n + 1, n + d}], {i, m + 1, m + d}];
tab = wybierz[zdjecie, th, tv, dl];

```

Out[7]= 400

```

In[12]:= (* probka danych *)
MatrixForm[Table[tab[[i, j]], {i, 1, 10}, {j, 1, 10}]]

```

Out[12]/MatrixForm=

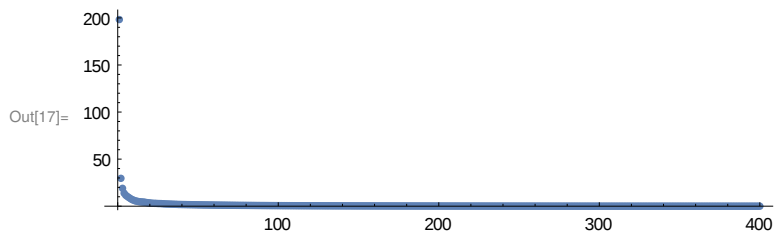
| | | | | | | | | |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 0.835294 | 0.823529 | 0.827451 | 0.827451 | 0.819608 | 0.823529 | 0.831373 | 0.827451 | 0.827451 |
| 0.847059 | 0.831373 | 0.831373 | 0.831373 | 0.823529 | 0.823529 | 0.827451 | 0.811765 | 0.823529 |
| 0.854902 | 0.835294 | 0.835294 | 0.835294 | 0.827451 | 0.827451 | 0.823529 | 0.807843 | 0.823529 |
| 0.85098 | 0.835294 | 0.831373 | 0.835294 | 0.831373 | 0.835294 | 0.831373 | 0.815686 | 0.827451 |
| 0.839216 | 0.823529 | 0.827451 | 0.835294 | 0.831373 | 0.839216 | 0.843137 | 0.831373 | 0.831373 |
| 0.835294 | 0.823529 | 0.827451 | 0.831373 | 0.823529 | 0.831373 | 0.839216 | 0.835294 | 0.827451 |
| 0.839216 | 0.827451 | 0.831373 | 0.827451 | 0.815686 | 0.819608 | 0.831373 | 0.827451 | 0.823529 |
| 0.847059 | 0.847059 | 0.835294 | 0.811765 | 0.811765 | 0.827451 | 0.831373 | 0.823529 | 0.807843 |
| 0.843137 | 0.843137 | 0.835294 | 0.827451 | 0.827451 | 0.831373 | 0.831373 | 0.827451 | 0.811765 |
| 0.823529 | 0.819608 | 0.823529 | 0.831373 | 0.835294 | 0.831373 | 0.827451 | 0.827451 | 0.815686 |

```
In[13]:= (* Rozkładanie macierzy tab=u.w.Transpose[v],
gdzie u i v sa ortogonalne, w diagonalna *)
{u, w, v} = SingularValueDecomposition[tab];
Image[u.w.Transpose[v]]
```



```
In[15]:= (* Kilka pierwszych wyrazow z diagonalni *)
Table[w[[i, i]], {i, 1, 50}]
diagonala = Table[{i, w[[i, i]]}, {i, 1, dl}];
Show[ListPlot[diagonala], PlotRange -> All, AspectRatio -> 0.3]
```

Out[15]= {198.248, 29.5863, 18.9753, 13.8019, 11.6147, 10.2888, 9.13975, 7.98553, 6.97794,
6.31001, 5.55399, 5.3204, 4.85549, 4.66954, 4.501, 4.40337, 4.17276, 3.8509,
3.59834, 3.43945, 3.20382, 3.07136, 3.00308, 2.95901, 2.82561, 2.78737,
2.75058, 2.57157, 2.4921, 2.36178, 2.31927, 2.23774, 2.17622, 2.11162,
2.04032, 1.99166, 1.91762, 1.83783, 1.81974, 1.76738, 1.73805, 1.71563,
1.68136, 1.63966, 1.62861, 1.58202, 1.56132, 1.51899, 1.49777, 1.45022}



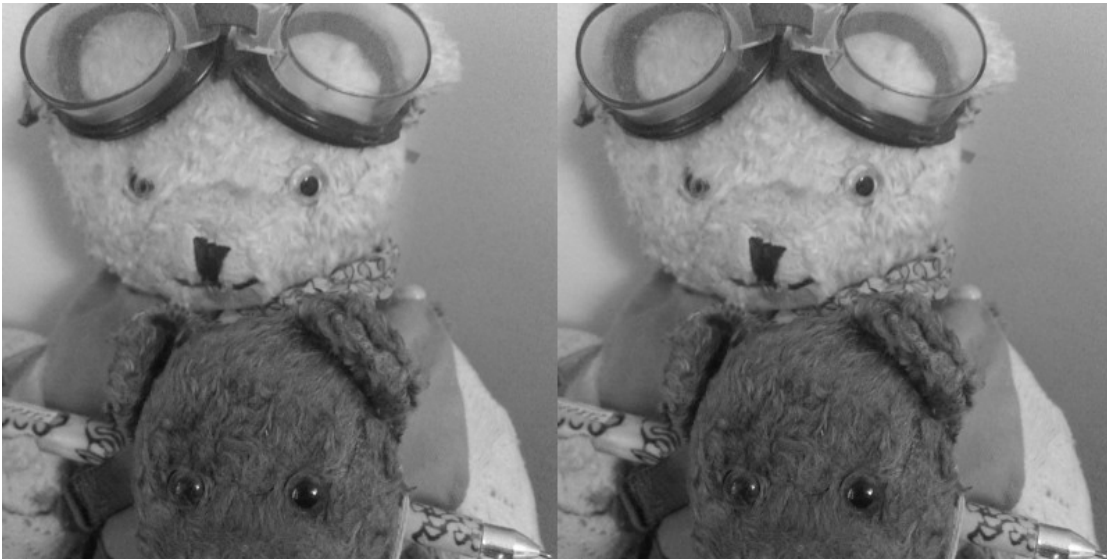
```
In[18]:= (* tworzenie z macierzy z pierwszych d wyrazow *)
lewa[d_] := Table[Take[u[[i]], {1, d}], {i, 1, dl}]
prawa[d_] := Table[Take[v[[i]], {1, d}], {i, 1, dl}]
srodek[d_] := Table[w[[i, j]], {i, 1, d}, {j, 1, d}]
kompresja[s_] := (d = Min[Max[1, Round[dl s]], dl];
  Print[d, " wartosci z przekatnej sposrod ", dl];
  lewa[d].srodek[d].Transpose[prawa[d]])
```

```
In[22]:= (* sklejanie obrazow *)
porownanie[s_] := Image[Transpose[Join[Transpose[kompresja[s]], Transpose[tab]]]]
```

```
In[23]:= porownanie[0.5]
```

200 wartosci z przekatnej sposrod 400

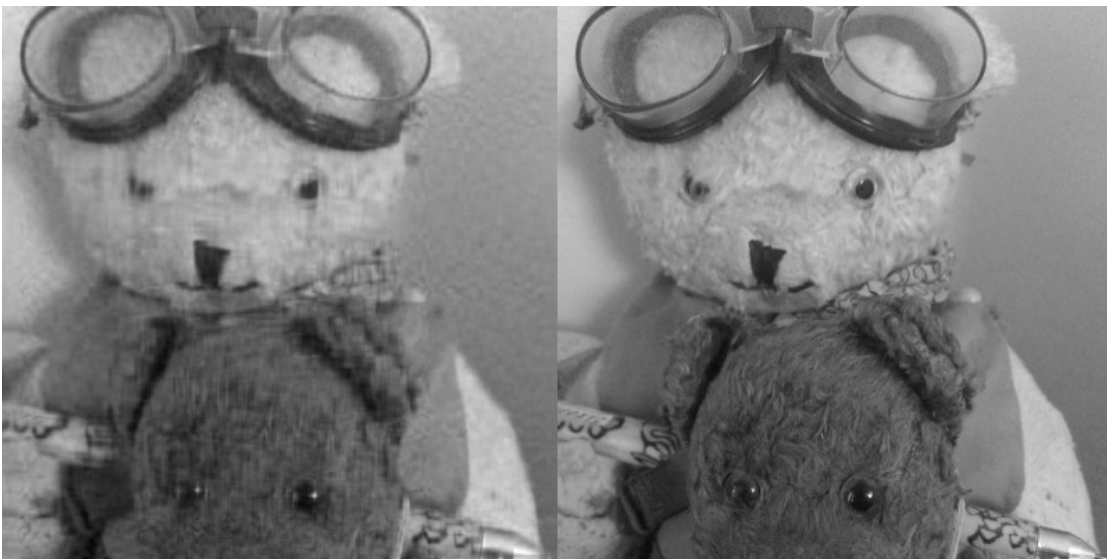
Out[23]=



```
In[24]:= porownanie[0.1]
```

40 wartosci z przekatnej sposrod 400

Out[24]=



In[25]:= `porownanie[0.05]`

20 wartosci z przekatnej sposrod 400

Out[25]=



In[26]:= `porownanie[0.02]`

8 wartosci z przekatnej sposrod 400

Out[26]=



In[27]:= `porownanie[0.01]`

4 wartosci z przekatnej sposrod 400

Out[27]=



In[28]:= `porownanie[0.005]`

2 wartosci z przekatnej sposrod 400

Out[28]=



In[29]:= `porownanie[0.003]`

1 wartosci z przekatnej sposrod 400

Out[29]=

