Katarzyna Sowa, zestaw 1

```
In[1]:= Clear["Global‘*"]

In[2]:= (*Zadanie 6N*)

In[3]:= A = {{4, 1, 0, 0, 0, 0, 0}, {1, 4, 1, 0, 0, 0, 0}, {0, 1, 4, 1, 0, 0, 0},
          {0, 0, 1, 4, 1, 0, 0}, {0, 0, 0, 1, 4, 1, 0}, {0, 0, 0, 0, 1, 4, 1}, {0, 0, 0, 0, 0, 1, 4}};

In[4]:= X = {x1, x2, x3, x4, x5, x6, x7};

In[5]:= B = {1, 2, 3, 4, 5, 6, 7};

In[6]:= N[LinearSolve[A, B], 10]

Out[6]= {0.1667893962, 0.3328424153, 0.5018409426,
         0.6597938144, 0.8589837997, 0.9042709867, 1.523932253}

In[7]:= Clear["Global‘*"]

In[8]:= (*Zadanie 8N*)

In[9]:= A = {{4, 1, 0, 0, 0, 0, 1}, {1, 4, 1, 0, 0, 0, 0}, {0, 1, 4, 1, 0, 0, 0},
          {0, 0, 1, 4, 1, 0, 0}, {0, 0, 0, 1, 4, 1, 0}, {0, 0, 0, 0, 1, 4, 1}, {1, 0, 0, 0, 0, 1, 4}};

In[10]:= X = {x1, x2, x3, x4, x5, x6, x7};

In[11]:= B = {1, 2, 3, 4, 5, 6, 7};

In[12]:= N[LinearSolve[A, B], 10]

Out[12]= {-0.2601626016, 0.4471544715, 0.4715447154,
          0.6666666667, 0.8617886179, 0.8861788618, 1.593495935}
```

W obydwu zadaniach 6N i 8N uzyto funkcji LinearSolve, ktora rozwiazuje rownania zapisane macierzowo A.x=B. Dodatkowo, uzyto funkcji N, by zapisac rozwiazania w postaci dziesietnej, nie w ulamkach, z wybrana (jako drugi argument funckji) precyzja rowna 10.

```
In[13]:= Clear["Global‘*"]

In[14]:= (*Zadanie 9N*)

In[15]:= A = {{-116.66654, 583.33346, -333.33308, 100.00012, 100.00012},
          {583.33346, -116.66654, -333.33308, 100.00012, 100.00012},
          {-333.33308, -333.33308, 133.33383, 200.00025, 200.00025},
          {100.00012, 100.00012, 200.00025, 50.000125, -649.99988},
          {100.00012, 100.00012, 200.00025, -649.99988, 50.000125}};

In[16]:= b1 = {-0.33388066, 1.08033290, -0.98559856, 1.31947922, -0.09473435};

In[17]:= b2 = {-0.33388066, 1.08033290, -0.98559855, 1.32655028, -0.10180541};

In[18]:= b3 = {0.72677951, 0.72677951, -0.27849178, 0.96592583, 0.96592583};

In[19]:= b4 = {0.73031505, 0.73031505, -0.27142071, 0.96946136, 0.96946136};

In[20]:= (*z_i= A^-1 b_i dla i=1,2,3,4*)

In[21]:= (*||b_1-b_2|| *)

In[22]:= b12 = Norm[b1 - b2]

Out[22]= 0.00999999

In[23]:= (*||b_3-b_4||*)
```

In[34]:=
```
b34 = Norm[b3 - b4]
```

Out[34]=
```
0.01
```

In[25]:=
```
A1 = Inverse[A]
```

Out[25]=
```
{{125.47, 125.472, 250.941, 125.471, 125.471},
 {125.472, 125.47, 250.941, 125.471, 125.471},
 {250.941, 250.941, 501.882, 250.941, 250.941},
 {125.471, 125.471, 250.941, 125.471, 125.469},
 {125.471, 125.471, 250.941, 125.469, 125.471}}
```

In[26]:=
```
z1 = A1.b1
z2 = A1.b2
z3 = A1.b3
z4 = A1.b4
```

Out[26]=
```
{0.00198286, -0.0000374455, -0.000219649, 0.000240551, -0.00177975}
```

Out[27]=
```
{0.00198537, -0.0000349361, -0.000214631, 0.000253162, -0.00178735}
```

Out[28]=
```
{354.885, 354.885, 709.768, 354.883, 354.883}
```

Out[29]=
```
{358.434, 358.434, 716.866, 358.432, 358.432}
```

In[30]:=
```
(* ||z1-z2|| / ||b1-b2|| *)
```

In[35]:=
```
z12 = Norm[z1 - z2] / b12
```

Out[35]=
```
0.00159518
```

In[36]:=
```
(* ||z3-z4|| / ||b3-b4|| *)
```

In[33]:=
```
z34 = Norm[z3 - z4] / b34
```

Out[33]=
```
1003.76
```

Uzyto funkcji Norm (norma wektora) oraz Inverse (funkcja obliczajaca A^{-1}). Kropka "." przedstawia mnozenie macierzowe. Widac,

ze algorytm prowadzi do duzych bledow – z12 jest bardzo male *w* porownaniu do z34.