Laboratorium 1

Janusz Pawlicki

1. Wstęp

Cel laboratorium:

1. Zaznajomienie się ze środowiskiem MATLAB [1]
2. Ćwiczenie umiejętności:
   a. posługiwania się interfejsem MATLABa (import i wizualizacja danych)
   b. tworzenia wektorów i tablic oraz dokonywania obliczeń na danych.

2.Przebieg laboratorium

Wykonanie zadań podanych w instrukcji.

A)

```
a = 23
```

```
a = 23
```

```
b = 5
```

```
b = 5
```

```
c = floor(a/b) %dzielenie z zaokrągleniem wyniku
```

```
c = 4
```

```
d = rem(a,b) %przechowanie reszty z dzielenia
```

```
d = 3
```

B)

```
v = [0;5;0;4;0]
```

```
v = 5×1
     0
     5
     0
     4
     0
```

C)

```
R2 = normrnd(3,5,[5,3]) %tablica zawierająca liczby pseudolosowe
```

```
R2 = 5×3
    8.1735    7.4420   10.1919
```

```
    6.6344   -2.7354    4.6260
    1.4828   -2.3444   -0.7746
    4.4694   -1.0475    9.8515
   -0.9364  -11.7214   -5.5576
```

D)

```
R3 = [v R2] % połączenie wektora v z tablicą R2
```

```
R3 = 5×4
         0    8.1735    7.4420   10.1919
    5.0000    6.6344   -2.7354    4.6260
         0    1.4828   -2.3444   -0.7746
    4.0000    4.4694   -1.0475    9.8515
         0   -0.9364  -11.7214   -5.5576
```

E)

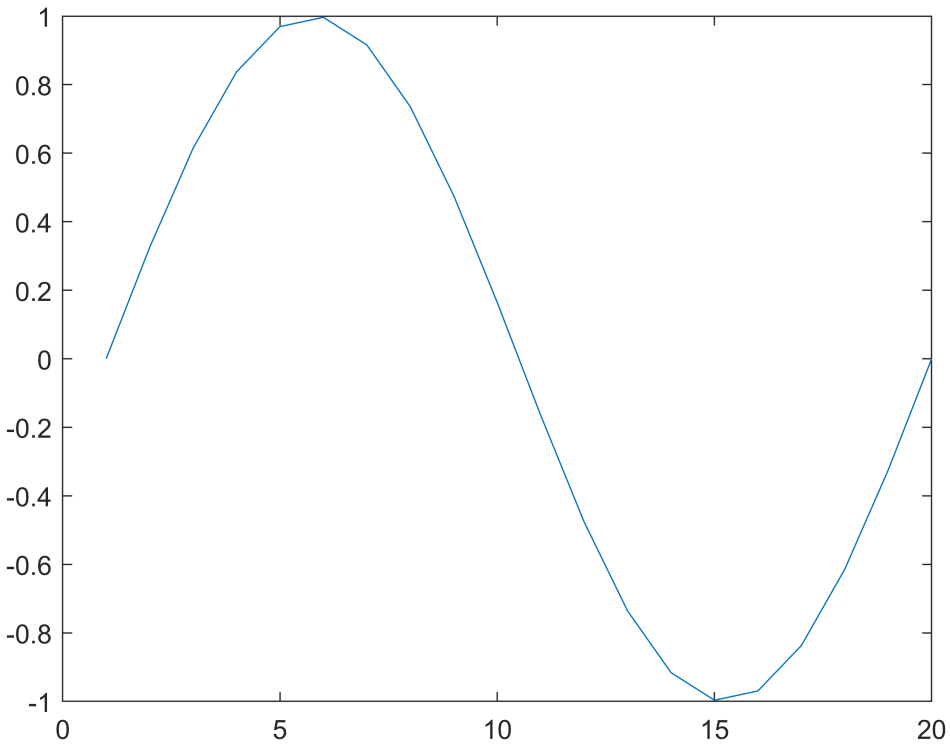
```
x = linspace(0 , 2* pi, 20)
```

```
x = 1×20
         0    0.3307    0.6614    0.9921    1.3228    1.6535    1.9842    2.3149 ···
```

```
y = sin(x)
```

```
y = 1×20
         0    0.3247    0.6142    0.8372    0.9694    0.9966    0.9158    0.7357 ···
```

```
plot(y)
```



F)

```
mean(y) % średnia z wektora y
```

```
ans = 5.4367e-17
```

G)

```
A = [1 2 3; -1 1 4; -1 -2 -3]
```

```
A = 3×3
     1     2     3
    -1     1     4
    -1    -2    -3
```

```
B = [5; 1; -5]
```

```
B = 3×1
     5
     1
    -5
```

```
C = A \ B % układ ma nieskończenie wiele rozwiązań
```

```
Warning: Matrix is singular to working precision.
C = 3×1
   NaN
   NaN
   NaN
```

H)

```
load exampledata.mat
M = 650
```

```
M = 650
```

```
N = 600
```

```
N = 600
```

```
K = 3
```

```
K = 3
```

```
R = RGB(:, :, 1)
```

```
R = 650×600
     0     0     0     0     0     0     0     0     0     0     0     0     0 ···
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
```

```
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     ⋮
```

```
G = RGB(:, :, 2)
```

```
G = 650×600
     0     0     0     0     0     0     0     0     0     0     0     0     0···
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     ⋮
```

```
B = RGB(:, :, 3)
```

```
B = 650×600
     0     0     0     0     0     0     0     0     0     0     0     0     0···
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     ⋮
```

```
R1 = R(:)'
```

```
R1 = 1×390000
     0     0     0     0     0     0     0     0     0     0     0     0     0···
```

```
G1 = G(:)'
```

```
G1 = 1×390000
     0     0     0     0     0     0     0     0     0     0     0     0     0···
```

```
B1 = B(:)' % zamiana tablic na wiersze
```

```
B1 = 1×390000
     0     0     0     0     0     0     0     0     0     0     0     0     0···
```

```
A = [R1; G1; B1] %połączenie wierszy
```

```
A = 3×390000
     0     0     0     0     0     0     0     0     0     0     0     0     0···
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
```

```
X = [0.299 0.587 0.114; -0.169 -0.331 0.5; 0.5 -0.419 -0.081]
```

```
X = 3×3
    0.2990    0.5870    0.1140
   -0.1690   -0.3310    0.5000
    0.5000   -0.4190   -0.0810
```

```
B = [0; 128; 128] + X * A
```

```
B = 3×390000
     0     0     0     0     0     0     0     0     0     0     0     0     0 ···
   128   128   128   128   128   128   128   128   128   128   128   128   128
   128   128   128   128   128   128   128   128   128   128   128   128   128
```

```
Y = reshape(B(1,:), [650, 600])
```

```
Y = 650×600
     0     0     0     0     0     0     0     0     0     0     0     0     0 ···
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     ⋮
```

```
Cb = reshape(B(2,:), [650, 600])
```

```
Cb = 650×600
   128   128   128   128   128   128   128   128   128   128   128   128   128 ···
   128   128   128   128   128   128   128   128   128   128   128   128   128
   128   128   128   128   128   128   128   128   128   128   128   128   128
   128   128   128   128   128   128   128   128   128   128   128   128   128
   128   128   128   128   128   128   128   128   128   128   128   128   128
   128   128   128   128   128   128   128   128   128   128   128   128   128
   128   128   128   128   128   128   128   128   128   128   128   128   128
   128   128   128   128   128   128   128   128   128   128   128   128   128
   128   128   128   128   128   128   128   128   128   128   128   128   128
   128   128   128   128   128   128   128   128   128   128   128   128   128
     ⋮
```

```
Cr = reshape(B(3,:), [650, 600]) % użycie funkcji reshape do stworzenia tablic [M, N]
```

```
Cr = 650×600
   128   128   128   128   128   128   128   128   128   128   128   128   128 ···
   128   128   128   128   128   128   128   128   128   128   128   128   128
   128   128   128   128   128   128   128   128   128   128   128   128   128
   128   128   128   128   128   128   128   128   128   128   128   128   128
   128   128   128   128   128   128   128   128   128   128   128   128   128
   128   128   128   128   128   128   128   128   128   128   128   128   128
   128   128   128   128   128   128   128   128   128   128   128   128   128
   128   128   128   128   128   128   128   128   128   128   128   128   128
   128   128   128   128   128   128   128   128   128   128   128   128   128
   128   128   128   128   128   128   128   128   128   128   128   128   128
     ⋮
```

```
YCbCr = zeros(M, N, K)
```

```
YCbCr =
YCbCr(:,:,1) =

     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0
     ⋮
```

```
YCbCr(:, :, 1) = Y
```

```
YCbCr =
YCbCr(:,:,1) =

        0        0        0        0        0        0        0        0        0        0        0
     ⋮
```

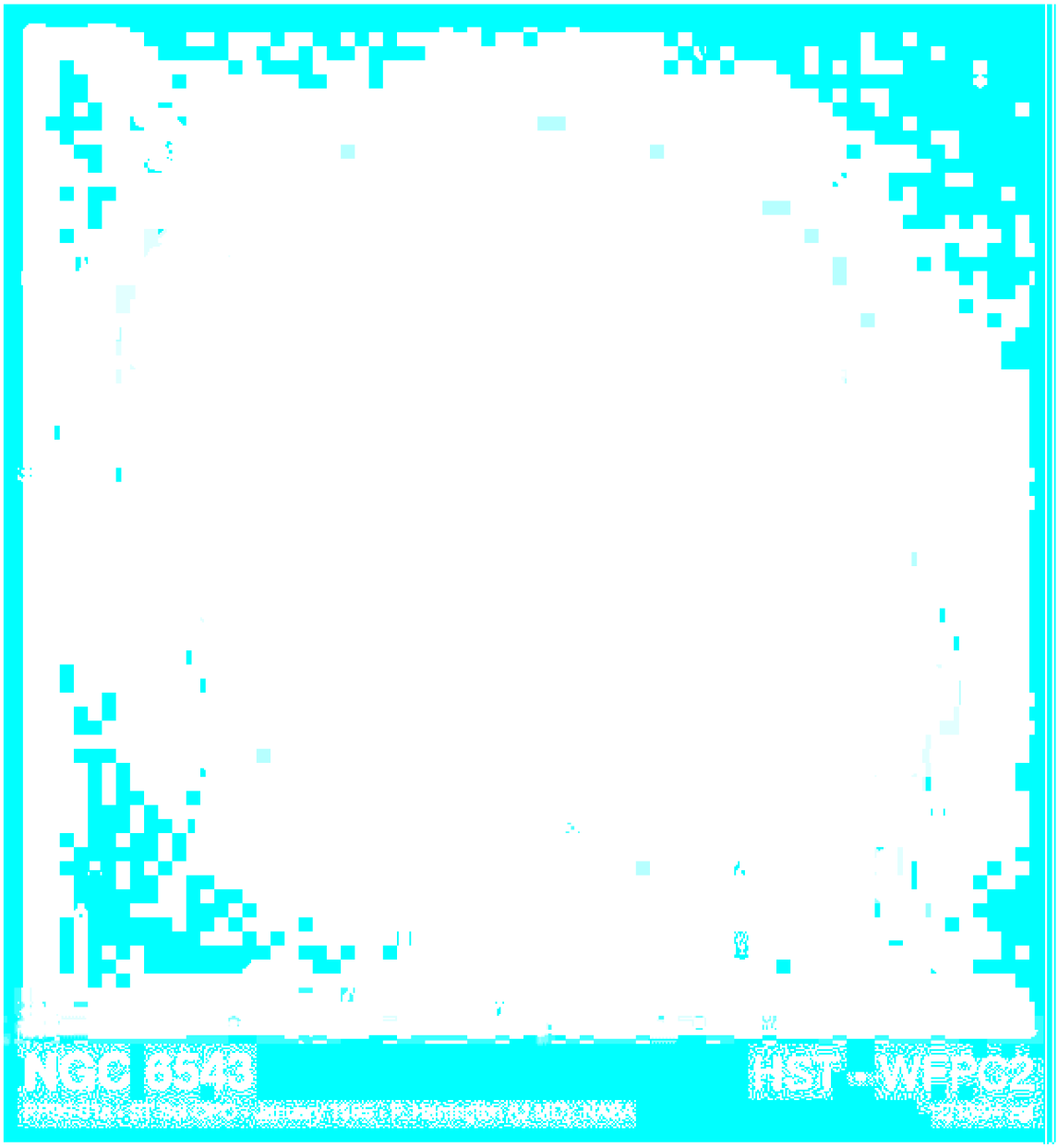
```
YCbCr(:, :, 2) = Cb
```

```
YCbCr =
YCbCr(:,:,1) =

        0        0        0        0        0        0        0        0        0        0        0
     ⋮
```

```
YCbCr(:, :, 3) = Cr
```

```
YCbCr =
YCbCr(:,:,1) =

        0        0        0        0        0        0        0        0        0        0        0
     ⋮
```

```
imshow(YCbCr) %wyświetlenie obrazu
```



l)

```
a = pi
```

```
a = 3.1416
```

```
b = ones(1, 1, "uint8")
```

```
b = uint8

    1
```

```
c = double(b)
```

```
c = 1
```

```
j = a + c
```

```
j = 4.1416
```

```
class(j)
```

```
ans =
'double'
```

J)

```
x = 'a':'g'
```

```
x =
'abcdefg'
```

```
ciag = x(randi(numel(x), [10 1]))
```

```
ciag =
'dcffbddeef'
```

```
for k = 1:length(ciag)
    disp(ciag(k))
end
```

```
d
c
f
f
b
d
d
e
e
f
```