Sveučilište u Zagrebu
Fakultet strojarstva i brodogradnje

Vježbe iz kolegija Računalna matematika: Matlab programski jezik - vježba br. **1**

Mario Essert, Andrej Jokić, Tihomir Žilić, Vladimir Milić

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Matlab kao kalkulator

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```
format compact   % uklanjanje suvisnih praznih redaka pri prikaz rjesenja
```

Matlab kao kalkulator

Koristeci naredbu `clear` mozete obrisati varijable iz radne memorije Matlaba, dok naredbom `clc` brisete sve iz Command Window-a. Naredbom `help` pozivate pomoc, npr. `help clear`.

1. Izracunajte:

$$\frac{63^3}{14^7 - 10^5} \cdot 300000$$

```
63^3/(14^7-10^5)*3e5
```

```
ans =
  712.2933
```

2. Izracunajte varijablu y:

$$y = 6 \cdot \frac{10}{13} + \frac{18}{5 \cdot 7} + 5 \cdot 9^2$$

```
y=6*10/13+18/(5*7)+5*9^2
```

```
y =
  410.1297
```

3. Izracunajte varijablu y:

$$y = 6 \cdot 35^{\frac{1}{4}} + 14^{0.35}$$

```
y=6*35^(1/4)+14^0.35
```

```
y =
   17.1123
```

4. Izracunajte varijablu y:

$$y = \frac{77^3}{13 \cdot 7} - 3 \cdot 10^3 + e^{-35 \cdot \pi}$$

```
y=(77^3)/(13*7)-3*10^3+exp(-35*pi)
```

```
y =
   2.0168e+03
```

5. Izracunajte kompleksnu varijablu y:

$$y = (-3 + 7i) \cdot (-8 - 6i^3)$$

```
y=(-3+7*i)*(-8-6*(i^3))
```

```
y =
 -18.0000 -74.0000i
```

Matrice, vektori i skalari

1. Napisite vektor `y1`:

$$y1 = \begin{bmatrix} 3 & 7+3\text{i} & 10 & 45\text{i} & 4\text{i} & 29+15\text{i} & 7\text{i} \end{bmatrix}$$

```
y1=[3 7+3i 10 j*45 i*4 29+i*15 7*j]
```

```
y1 =
  Columns 1 through 6
   3.0000     7.0000 + 3.0000i  10.0000     0 +45.0000i    0 + 4.0000i  29.0000 +15.0000i
  Column 7
        0 + 7.0000i
```

2. Napisite matricu `y2`:

$$y2 = \begin{bmatrix} 25\text{-}8\text{i} & 10 & 45 \\ 11+2\text{i} & 12 & 99 \end{bmatrix}$$

```
y2=[25-8*i 10 45;11+j*2 12 99]
```

```
y2 =
  25.0000 - 8.0000i  10.0000            45.0000
  11.0000 + 2.0000i  12.0000            99.0000
```

3. Napisite vektor `y3`:

$$y3 = \begin{bmatrix} 8 \\ 11\text{-}4\text{i} \\ 101 \\ 5\text{i} \\ 89 \\ 11 \\ 1+\text{i} \end{bmatrix}$$

```
y3=[8;11-4i;101;5i;89;11;1+i]
```

```
y3 =
   1.0e+02 *
   0.0800
   0.1100 - 0.0400i
   1.0100
        0 + 0.0500i
   0.8900
   0.1100
   0.0100 + 0.0100i
```

4. Izracunajte stupcasti vektor `y4`:

Transponiranje kompleksne matrice operatorom **'** kompleksno ju konjugira. Ako se zeli samo transponiranje kompleksne matrice (bez konjugacije) onda treba koristiti operator **.'**

$$y4 = y1 + y3$$

```
y4=y1.'+y3
```

```
y4 =
   1.0e+02 *
   0.1100
   0.1800 - 0.0100i
   1.1100
        0 + 0.5000i
   0.8900 + 0.0400i
   0.4000 + 0.1500i
   0.0100 + 0.0800i
```

5. Izracunajte stupcasti vektor `y5=y3*y1'`:

$$y5 = \begin{bmatrix} 8 \\ 11\text{-}4\text{i} \\ 101 \\ 5\text{i} \\ 89 \\ 11 \\ 1\text{+i} \end{bmatrix} \cdot \begin{bmatrix} 3 \\ 7\text{+}3\text{i} \\ 10 \\ 45\text{i} \\ 4\text{i} \\ 29\text{+}15\text{i} \\ 7\text{i} \end{bmatrix}$$

```
y5=y3.*y1'
```

```
y5 =
   1.0e+03 *
   0.0240
   0.0650 - 0.0610i
   1.0100
   0.2250
        0 - 0.3560i
   0.3190 - 0.1650i
   0.0070 - 0.0070i
```

6. Izracunajte matricu `y6` matricnim mnozenjem vektora y3 i y1:

$$y6 = \begin{bmatrix} 8 \\ 11\text{-}4\text{i} \\ 101 \\ 5\text{i} \\ 89 \\ 11 \\ 1\text{+i} \end{bmatrix} \cdot \begin{bmatrix} 3 & 7\text{+}3\text{i} & 10 & 45\text{i} & 4\text{i} & 29\text{+}15\text{i} & 7\text{i} \end{bmatrix}$$

```
y6=y3*y1
```

```
y6 =
   1.0e+03 *
  Columns 1 through 4
   0.0240            0.0560 + 0.0240i   0.0800                  0 + 0.3600i
   0.0330 - 0.0120i   0.0890 + 0.0050i   0.1100 - 0.0400i   0.1800 + 0.4950i
   0.3030            0.7070 + 0.3030i   1.0100                  0 + 4.5450i
        0 + 0.0150i  -0.0150 + 0.0350i        0 + 0.0500i  -0.2250
   0.2670            0.6230 + 0.2670i   0.8900                  0 + 4.0050i
   0.0330            0.0770 + 0.0330i   0.1100                  0 + 0.4950i
   0.0030 + 0.0030i   0.0040 + 0.0100i   0.0100 + 0.0100i  -0.0450 + 0.0450i
Columns 5 through 7
        0 + 0.0320i   0.2320 + 0.1200i    0 + 0.0560i
   0.0160 + 0.0440i   0.3790 + 0.0490i    0.0280 + 0.0770i
        0 + 0.4040i   2.9290 + 1.5150i    0 + 0.7070i
  -0.0200            -0.0750 + 0.1450i   -0.0350
        0 + 0.3560i   2.5810 + 1.3350i    0 + 0.6230i
        0 + 0.0440i   0.3190 + 0.1650i    0 + 0.0770i
  -0.0040 + 0.0040i   0.0140 + 0.0440i   -0.0070 + 0.0070i
```

7. Izracunajte matricu `y7` matricnim mnozenjem vektora y1 i y3:

$$y7 = \begin{bmatrix} 3 & 7+3i & 10 & 45i & 4i & 29+15i & 7i \end{bmatrix} \cdot \begin{bmatrix} 8 \\ 11\text{-}4i \\ 101 \\ 5i \\ 89 \\ 11 \\ 1+i \end{bmatrix}$$

```
y7=y1*y3
```

```
y7 =
   1.2100e+03 + 5.3300e+02i
```

8. Iz matrice `y6` izlucite element `y8` na mjestu:

$$(4, 6)$$

```
y8=y6(4,6)
```

```
y8 =
  -7.5000e+01 + 1.4500e+02i
```

9. Iz matrice `y6` izlucite matricu `y9` s elementima na mjestima:

(1,2) (1,3) (1,4) (1,5)
(2,2) (2,3) (2,4) (2,5)

```
y9=y6([1 2],[2 3 4 5])
```

```
y9 =
   1.0e+02 *
   0.5600 + 0.2400i   0.8000                  0 + 3.6000i        0 + 0.3200i
   0.8900 + 0.0500i   1.1000 - 0.4000i   1.8000 + 4.9500i   0.1600 + 0.4400i
```

10. Kreirajte vektor `y10`:

`y10` je vektor od **-1.2** do **3.1** s korakom **0.2**

```
y10=-1.2:0.2:3.1
```

```
y10 =
  Columns 1 through 8
   -1.2000   -1.0000   -0.8000   -0.6000   -0.4000   -0.2000    0.0000    0.2000
  Columns 9 through 16
    0.4000    0.6000    0.8000    1.0000    1.2000    1.4000    1.6000    1.8000
  Columns 17 through 22
    2.0000    2.2000    2.4000    2.6000    2.8000    3.0000
```