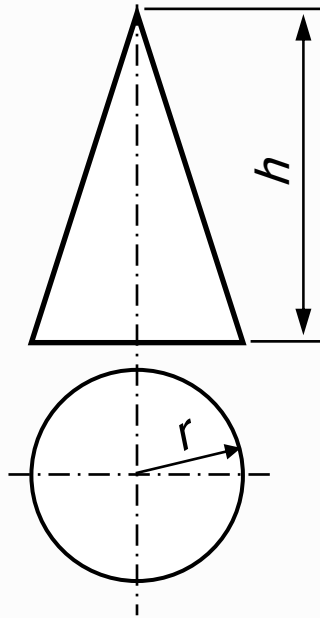


1-1. naloga: volumen stožca

1-1. naloga: volumen stožca

$$V_{\text{stožca}} = \frac{\pi r^2 h}{3}$$



a) $r = 2.9$ cm
 $h = 5.8$ cm

b) $r = 2.9$ cm
 $h = 1.5, 1.9, 2.2, 3.5, 5.8$ [cm]

c) $r = 2.9, 4.5, 8.8, 9.3, 12.4$ [cm]
 $h = 5.8$ cm

d) $r = 2.9, 4.5, 8.8, 9.3, 12.4$ [cm]
 $h = 1.5, 1.9, 2.2, 3.5, 5.8$ [cm]

1-1. naloga: volumen stožca

The image shows a MATLAB environment with an Editor window and a Command Window. The Editor window contains a script named 'C:\Temp\MATLAB\NM_1_vaja.m' with the following code:

```
1 - clc;
2 - clear all;
3 - format compact;
4 - %a)
5 - r = 2.9; %[cm]
6 - h = 5.8; %[cm]
7 - Va = pi*r^2*h/3 %[cm^3]
8 - %b)
9 - r = 2.9; %[cm]
10 - h = [1.5 1.9 2.2 3.5 5.8]; %[cm]
11 - Vb = pi * r^2 * h / 3 %[cm^3]
12 - %c)
13 - r = [2.9 4.5 8.8 9.3 12.4]; %[cm]
14 - h = 5.8; %[cm]
15 - Vc = pi * r.^2 * h / 3 %[cm^3]
16 - %d1)
17 - r = [2.9 4.5 8.8 9.3 12.4]; %[cm]
18 - h = [1.5 1.9 2.2 3.5 5.8]; %[cm]
19 - Vd1 = pi * r.^2 .* h / 3 %[cm^3]
20 - %d2)
21 - Vd2 = pi * (r.^2) * h / 3 %[cm^3]
```

The Command Window shows the output of the script:

```
Va =
    51.0802
Vb =
    13.2104    16.7332    19.3752    30.8243    51.0802
Vc =
    51.0802    122.9934    470.3509    525.3183    933.8992
Vd1 =
    13.2104    40.2909    178.4090    317.0024    933.8992
Vd2 =
    13.2104    16.7332    19.3752    30.8243    51.0802
    31.8086    40.2909    46.6527    74.2201    122.9934
    121.6425    154.0805    178.4090    283.8324    470.3509
    135.8582    172.0870    199.2587    317.0024    525.3183
    241.5256    305.9325    354.2376    563.5598    933.8992
>>
```

The Workspace window shows the following variables:

Name	Value	Class
Va	51.0802	double
Vb	[13.2104 16.7332 19.37...]	double
Vc	[51.0802 122.9934 470....]	double
Vd1	[13.2104 40.2909 178.4...]	double
Vd2	<5x5 double>	double
h	[1.5 1.9 2.2 3.5 5.8]	double
r	[2.9 4.5 8.8 9.3 12.4]	double

1-2. naloga: izračun funkcije $\sin(x)$ s končno vrsto

1-2. naloga: izračun funkcije $\sin(x)$ s končno vrsto

$$\sin(x) = \frac{x^1}{1!} - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$$

1-2. naloga: izračun funkcije $\sin(x)$ s končno vrsto

The screenshot shows the MATLAB environment with the following components:

- Workspace:** A table listing variables and their values:

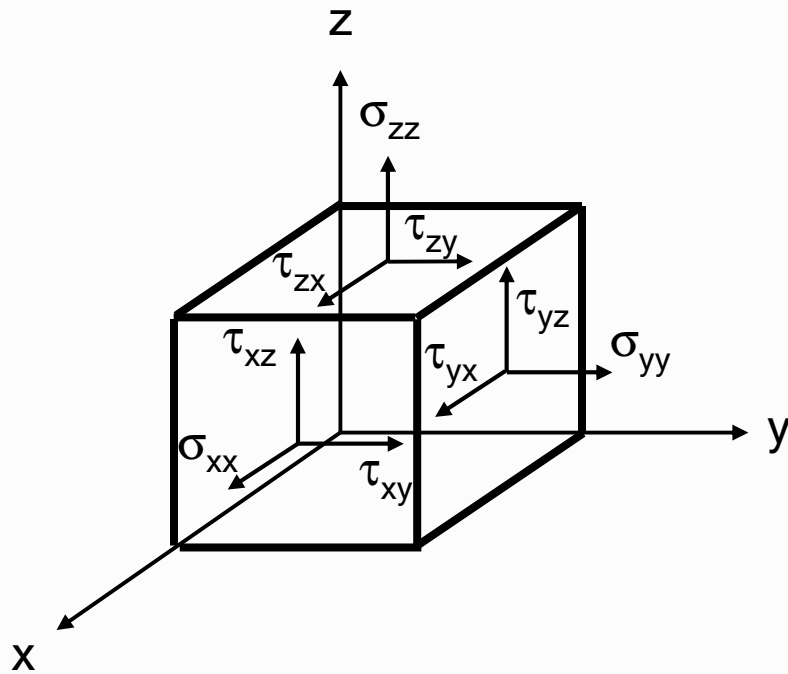
Name	Value
Neks	[1 3 5 7 9]
Nmax	5
Npred	[0 1 2 3 4]
fi	30
sinN	0.5
x	0.5236
- Editor:** A script file named 'nal_2_1.m' containing the following code:

```
1 % sin(x) = x^1/1! - x^3/3! + x^5/5! + ...
2 - clc;
3 - clear all;
4 - format compact;
5 - format long;
6 - fi = input('Podaj kot v stopnjah: ');
7 - x = fi*pi/180; %[rad]
8 - Nmax = input('Stevilo upostevanih členov vrste: ');
9 - Neks=1:2:Nmax*2;
10 - Npred=0:1:Nmax-1;
11 - sinN=x.^Neks;
12 - sinN=sinN./factorial(Neks);
13 - sinN=sinN.*(-1).^Npred;
14 - sinN=sum(sinN)
```
- Command Window:** Shows the execution of the script with user input and output:

```
Podaj kot v stopnjah: 30
Stevilo upostevanih členov vrste: 5
sinN =
    0.500000000002028
>>
```

1-3. naloga: izračun glavnih napetosti in smeri glavnih napetosti

1-3. naloga: izračun glavnih napetosti in smeri glavnih napetosti



$$\sigma_{ij} = \begin{pmatrix} 20 & 10 & 0 \\ 10 & -30 & -15 \\ 0 & -15 & 50 \end{pmatrix} \text{MPa}$$

- izračunajte glavne napetosti
- izračunajte vektorje v smereh glavnih napetosti
- preverite ali so smeri glavnih napetosti medseboj pravokotne

1-3. naloga: izračun glavnih napetosti in smeri glavnih napetosti

The image shows the MATLAB environment with a script editor and a command window. The script calculates principal stresses and directions from a stress tensor. The workspace shows the variables defined in the script, and the command window shows the output of the script.

```
2 - clc;
3 - clear all;
4 - format compact;
5 - sig = [ 20 10 0
6         10 -30 -15
7         0 -15 50 ]; % [MPa]
8 - sG = eig(sig)
9 - [vektsigG,sigG] = eig(sig)
10 - spr = dot(vektsigG(1,1:3),vektsigG(2,1:3))
11 - vpr = cross(vektsigG(1,1:3),vektsigG(2,1:3))
12
```

Workspace:

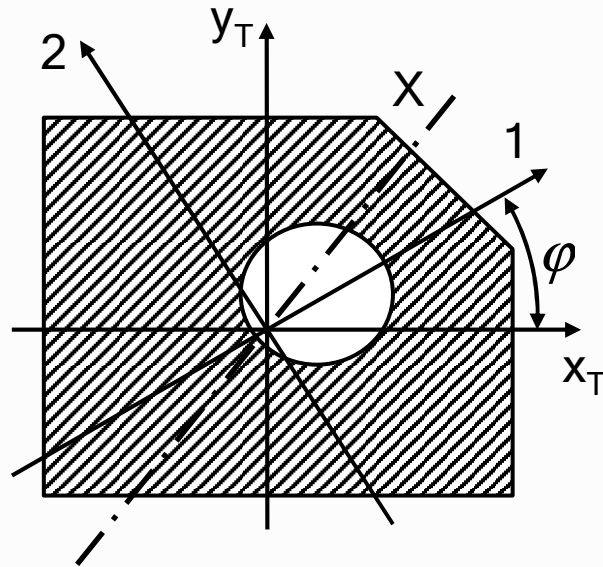
Name	Value
sG	[-34.4977;21.6773;52.8205]
sig	[20 10 0;10 -30 -15;0 -15 50]
sigG	[-34.4977 0 0;0 21.6773 0;0 0 52.8205]
spr	3.296e-017
vekt...	[-0.1778 0.9825 0.0562;0.9689 0.1648 0.1845;0.172 0.0873 -0.9812]
vpr	[0.172 0.0873 -0.9812]

Command Window:

```
sG =
-34.4977
 21.6773
 52.8205
vektsigG =
-0.1778    0.9825    0.0562
 0.9689    0.1648    0.1845
 0.1720    0.0873   -0.9812
sigG =
-34.4977         0         0
         0  21.6773         0
         0         0  52.8205
spr =
 3.2960e-017
vpr =
 0.1720    0.0873   -0.9812
```

1-4. naloga: karakteristike prereza

1-4. naloga: karakteristike prereza



$$I_{x_T} = 728,60 \text{ cm}^4$$

$$I_{y_T} = 714,60 \text{ cm}^4$$

$$I_{x_T y_T} = -92,57 \text{ cm}^4$$

$$[I_{x_T y_T}] = \begin{bmatrix} I_{x_T} & I_{x_T y_T} \\ I_{x_T y_T} & I_{y_T} \end{bmatrix}$$

$$I_1 > I_2$$

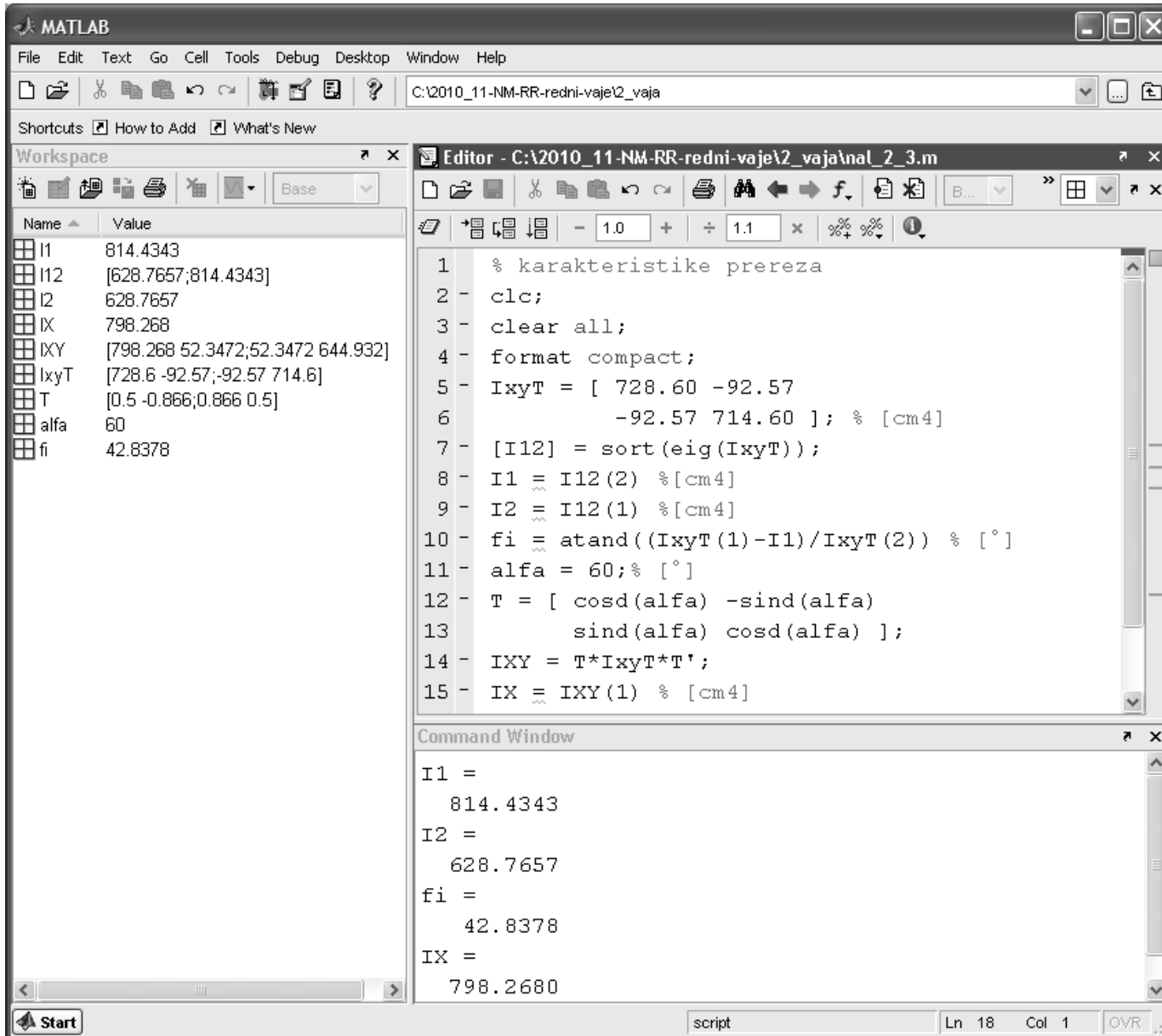
$$\varphi = \arctan \frac{I_{x_T} - I_1}{I_{x_T y_T}}$$

$$T = \begin{bmatrix} \cos(\alpha) & -\sin(\alpha) \\ \sin(\alpha) & \cos(\alpha) \end{bmatrix}$$

$$[I_{XY}] = [T] [I_{x_T y_T}] [T]^T$$

- izračunajte glavne vztrajnostne momente prereza
- izračunajte lego glavnih vztrajnostnih osi
- izračunajte vztrajnostni moment prereza okoli osi, ki oklepa s x_T osjo 60° kot

1-4. naloga: karakteristike prereza



The image shows the MATLAB environment with a script editor and a command window. The script calculates the characteristic of a transformer and its output values. The workspace shows the results of the calculations.

Script Editor (C:\2010_11-NM-RR-redni-vaje\2_vaja\nal_2_3.m):

```
1 % karakteristike prereza
2 - clc;
3 - clear all;
4 - format compact;
5 - IxyT = [ 728.60 -92.57
6           -92.57 714.60 ]; % [cm4]
7 - [I12] = sort(eig(IxyT));
8 - I1 = I12(2) % [cm4]
9 - I2 = I12(1) % [cm4]
10 - fi = atand((IxyT(1)-I1)/IxyT(2)) % [°]
11 - alfa = 60;% [°]
12 - T = [ cosd(alfa) -sind(alfa)
13         sind(alfa) cosd(alfa) ];
14 - IXY = T*IxyT*T';
15 - IX = IXY(1) % [cm4]
```

Workspace:

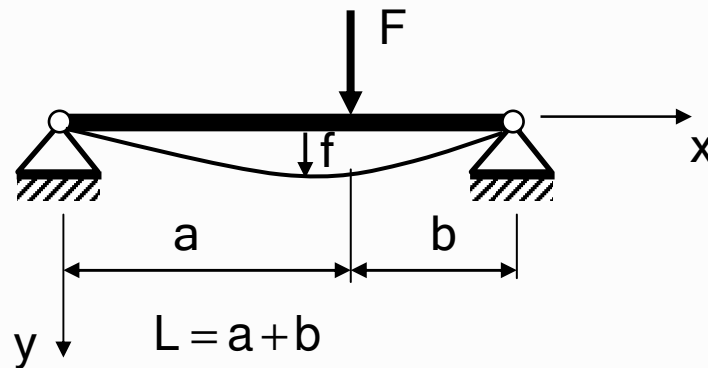
Name	Value
I1	814.4343
I12	[628.7657;814.4343]
I2	628.7657
IX	798.268
IXY	[798.268 52.3472;52.3472 644.932]
IxyT	[728.6 -92.57;-92.57 714.6]
T	[0.5 -0.866;0.866 0.5]
alfa	60
fi	42.8378

Command Window:

```
I1 =
    814.4343
I2 =
    628.7657
fi =
    42.8378
IX =
    798.2680
```

1-5. naloga: upogibno obremenjeni nosilec

1-5. naloga: upogibno obremenjeni nosilec



$$F = 10 \text{ kN}$$

$$a = 3 \text{ m}$$

$$b = 2 \text{ m}$$

$$E = 2 \cdot 10^5 \text{ MPa}$$

$$J = 5 \cdot 10^6 \text{ mm}^4$$

$$0 \leq x \leq a:$$

$$f_1(x) = \frac{Fab^2 x}{6EJL} \left(1 + \frac{L}{b} - \frac{x^2}{ab} \right)$$

$$a \leq x \leq L:$$

$$f_2(x) = \frac{Fa^2 b(L-x)}{6EJL} \left(1 + \frac{L}{a} - \frac{(L-x)^2}{ab} \right)$$

- izračunajte velikost maksimalnega povesa in lego le-tega
- izrišite upogibnico

1-5. naloga: upogibno obremenjeni nosilec

