

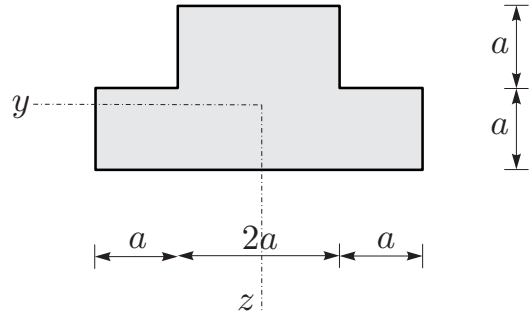
Vpisna številka: 261 _ _ _ _ _

naloga	točk
1	
2	
3	

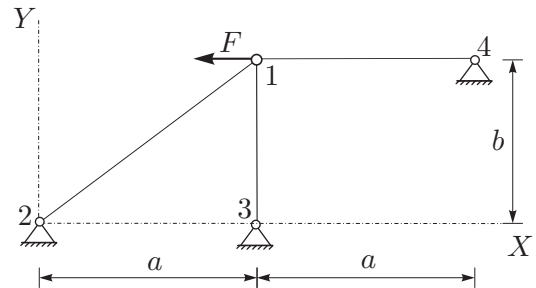
TRDNOST (VSŠ) - 3. KOLOKVIJ (13. 1. 2015)

Pazljivo preberite besedilo vsake naloge! Pišite čitljivo! Uspešno reševanje!

1. Prerez na sliki je obremenjen s prečno silo $N_z = 15 \text{ kN}$ in upogibnim momentom $M_y = 10 \text{ kNm}$. Določite potek normalnih napetosti σ_{xx} in potek strižnih napetosti σ_{xz} po prerezu! (30%)
Podatki: $a = 10 \text{ cm}$.

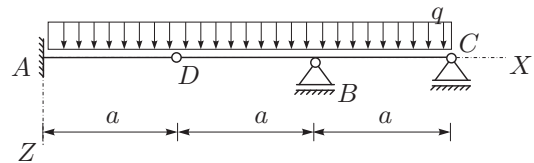


2. Za paličje na sliki določite pomike vozlišč! (30%)
Podatki: $a = 4 \text{ m}$, $b = 3 \text{ m}$, $F = 10 \text{ MN}$,
 $E = 2 \cdot 10^5 \text{ MPa}$, $A = 0.02 \text{ m}^2$,



3. Za konstrukcijo na sliki izračunajte notranje statične količine po metodi sil! Pri določanju velikosti nadomestnih sil ni treba upoštevati vpliva osnih in prečnih sil. (40%)

Podatki: $a = 3 \text{ m}$, $q = 2 \text{ kN/m}$,
 $E = 20000 \text{ kN/cm}^2$, $A = 100 \text{ cm}^2$,
 $I_y = 20000 \text{ cm}^4$.



```
In[35]= GeometrijskeKarakteristike[{{10, 0}, {10, 10}, {20, 10},
      {20, 20}, {-20, 20}, {-20, 10}, {-10, 10}, {-10, 0}, {10, 0}}]
```

```
Ax      = 600.
```

```
yT      = 0.
```

```
zT      = 11.6667
```

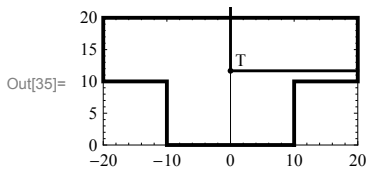
```
Iy      = 100 000.
```

```
Iz      = 60 000.
```

```
Iyz     = 0.
```

```
IyT    = 18 333.3
```

```
IzT    = 60 000.
```



```
In[36]= zt = -11.666666666666666; Iy = 18 333.333333333332;
```

```
S1 = StaticniMomentY[{{10, zt}, {10, z}, {-10, z}, {-10, zt}, {10, zt}}]
```

```
S1 /. z -> zt
```

```
S1 /. z -> zt + 10
```

```
S2 = StaticniMomentY[{{10, zt}, {10, zt + 10}, {20, zt + 10}, {20, z},
```

```
  {-20, z}, {-20, zt + 10}, {-10, zt + 10}, {-10, zt}, {10, zt}}]
```

```
S2 /. z -> zt + 10
```

```
S2 /. z -> 0
```

```
S2 /. z -> zt + 20
```

```
Out[37]= 10. (-136.111 + z2)
```

```
Out[38]= 0.
```

```
Out[39]= -1333.33
```

```
Out[40]= 20. (-69.4444 + z2)
```

```
Out[41]= -1333.33
```

```
Out[42]= -1388.89
```

```
Out[43]= 5.68434 × 10-13
```

```
In[44]= σxx = N[10 000 * 100 / Iy] * {zt, zt + 20}
```

```
Out[44]= {-636.364, 454.545}
```

```
In[45]= σxx1 = N[15 000 / Iy * 1333.3333333333333] / 20
```

```
Out[45]= 54.5455
```

```
In[46]= σxx2 = N[15 000 / Iy * 1333.3333333333333] / 40
```

```
Out[46]= 27.2727
```

```
In[47]= σxx_ekst = σxx2 = N[15 000 / Iy * 1388.8888888888887] / 40
```

```
Out[47]= 28.4091
```

TABELA DOLŽIN, KOSINUSOV IN OSNIH TOGOSTI ZA PODANO PALIČJE

palica	vozel1	vozel2	dolzina	cos(a_ij)	cos(b_ij)	k_ij
1	1	2	5.000	-0.800	-0.600	800.000
2	1	3	3.000	0.000	-1.000	1333.333
3	1	4	4.000	1.000	0.000	1000.000

TOGOSTNA MATRIKA PALIČJA

-1512.000	-384.000	512.000	384.000	0.000	0.000	1000.000	0.000
-384.000	-1621.333	384.000	288.000	0.000	1333.333	0.000	0.000
512.000	384.000	-512.000	-384.000	0.000	0.000	0.000	0.000
384.000	288.000	-384.000	-288.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	1333.333	0.000	0.000	0.000	-1333.333	0.000	0.000
1000.000	0.000	0.000	0.000	0.000	0.000	-1000.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

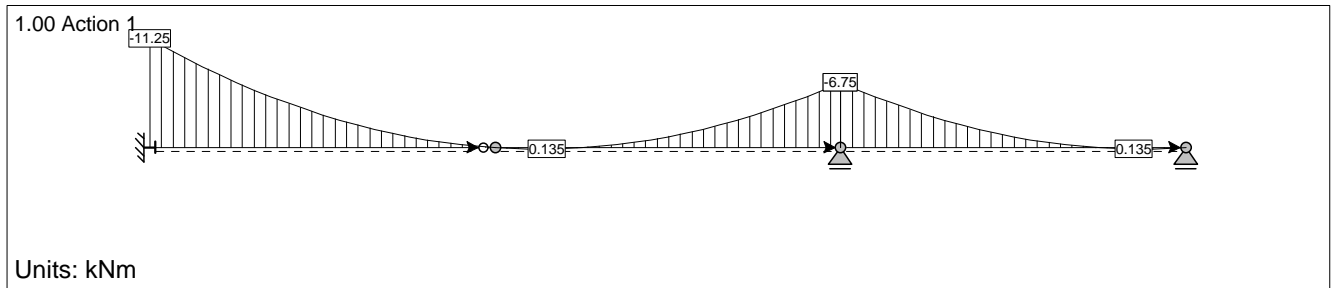
POMIKI IN REAKCIJE VOZLIŠČ DANEGA PALIČJA

vozel	u_x	u_y	R_x	R_y
1	-0.00704	0.00167		
2	0.00000	0.00000	2.963	2.222
3	0.00000	0.00000	0.000	-2.222
4	0.00000	0.00000	7.037	0.000

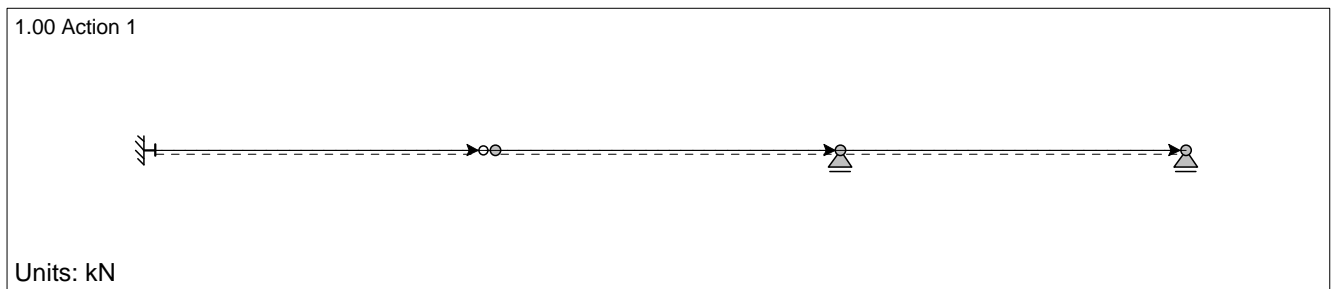
TABELA OSNIH SIL ZA PODANO PALIČJE

palica	vozel1	vozel2	N_ij
1	1	2	-3.704
2	1	3	2.222
3	1	4	7.037

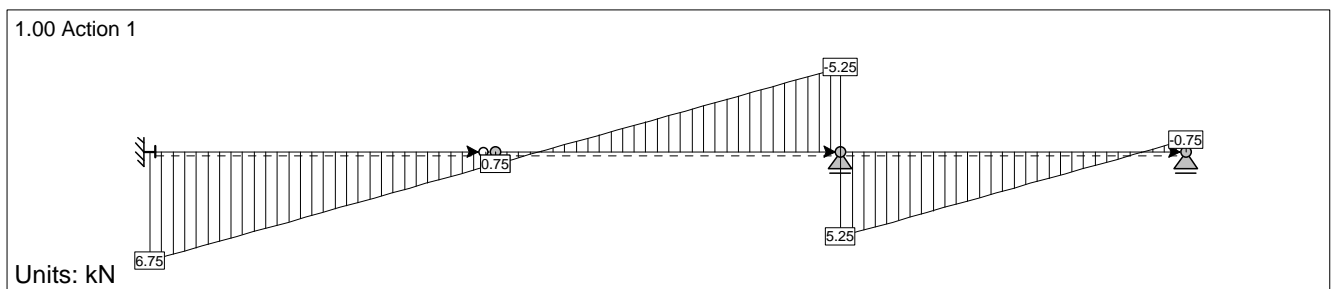
LC1: Load case 2: Bending Moments My



LC1: Load case 2: Axial Forces Fx



LC1: Load case 2: Shear Forces Fz



LC1: Load case 2: Displacements and Reactions

