

GOJKO MAGAZINVIĆ

KONSTRUIRANJE POMOĆU RAČUNALA 2

Uvod u predmet

Zavod za strojarstvo i brodogradnju

Fakultet elektrotehnike, strojarstva i brodogradnje
Sveučilište u Splitu



Ciljevi

- Naučiti izvršavati jednostavne proračune proračunskim tablicama primjenom programa *Microsoft Excel*
 - Naučiti grafički prikazivati rezultate proračuna primjenom proračunskih tablica
 - Naučiti naprednije tehnike modeliranja i uređivanja modela
 - Naučiti povezivati CAD modele i pripadne proračune načinjene proračunskim tablicama
 - Razumjeti temeljne pojmove strukturne analize
-

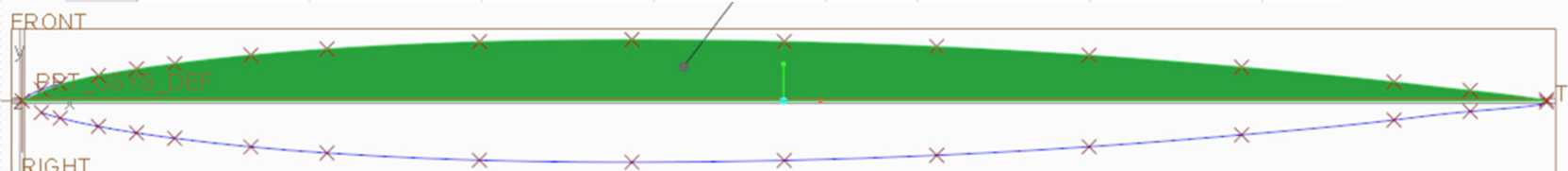
Osoblje

- Predavanja: prof.dr.sc. Gojko Magazinović
Soba: C606
E-pošta: gmag@fesb.hr
Tel. 305-966
Primanja: srijeda, 18:15-19:00 [na daljinu]

- Vježbe: predmetni nastavnik

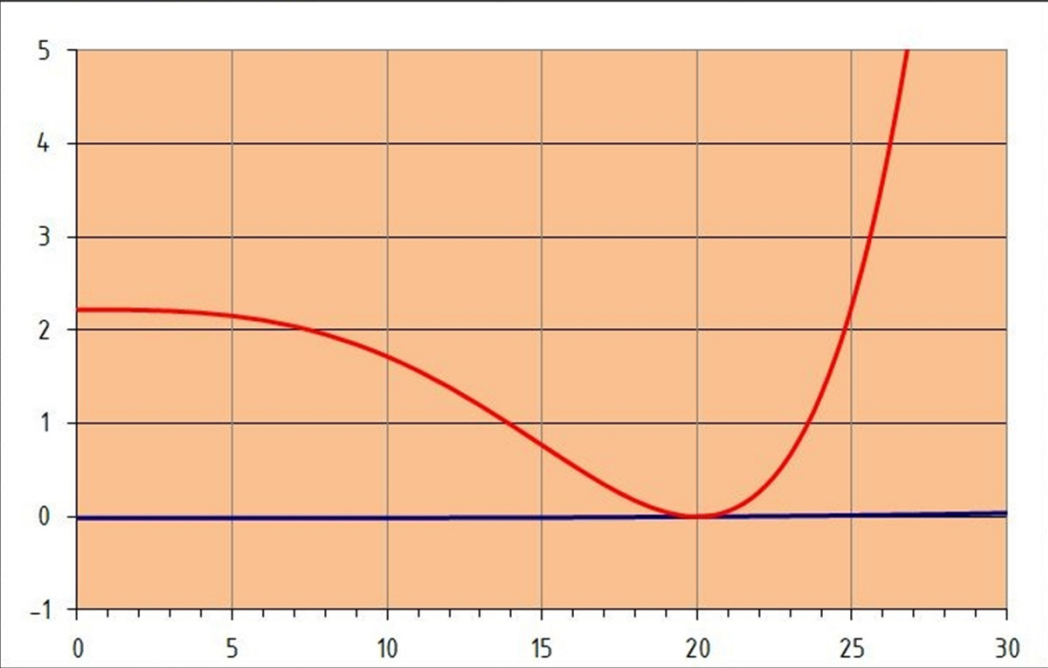
Proračunske tablice – numerička integracija

	A	B	C	D	E	F	G
1							
2	Površina numeričkom integracijom					Točno =	0.0281
3							
4			Trapezno pravilo			Simpsonovo pravilo	
5	x	y	kT	kT*y		kS	kS*y
6	1	0.0008	1	0.0008		1	0.0008
7	0.9	0.01244	2	0.0249		4	0.0498
8	0.8	0.02213	2	0.0443		2	0.0443
9	0.7	0.02987	2	0.0597		4	0.1195
10	0.6	0.03547	2	0.0709		2	0.0709
11	0.5	0.03884	2	0.0777		4	0.1554
12	0.4	0.04	2	0.0800		2	0.0800
13	0.3	0.03867	2	0.0773		4	0.1547
14	0.2	0.03396	2	0.0679		2	0.0679
15	0.1	0.02436	2	0.0487		4	0.0974
16	0	0	1	0.0000		1	0.0000
17							
18			AT =	0.0276		AS =	0.0280
19							
20			Greška =	-1.73%			-0.28%



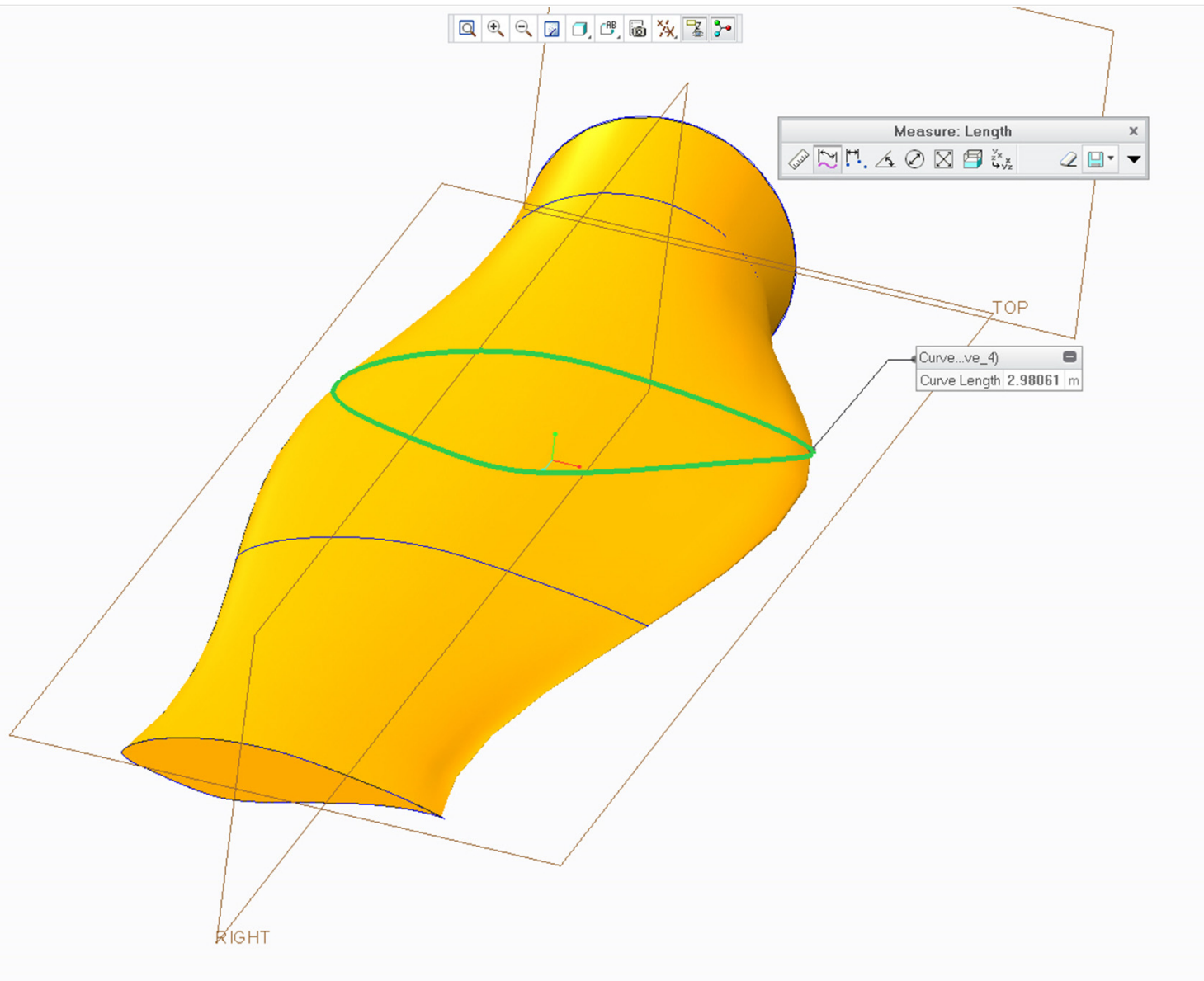
Proračunske tablice – rješavanje jednadžbi

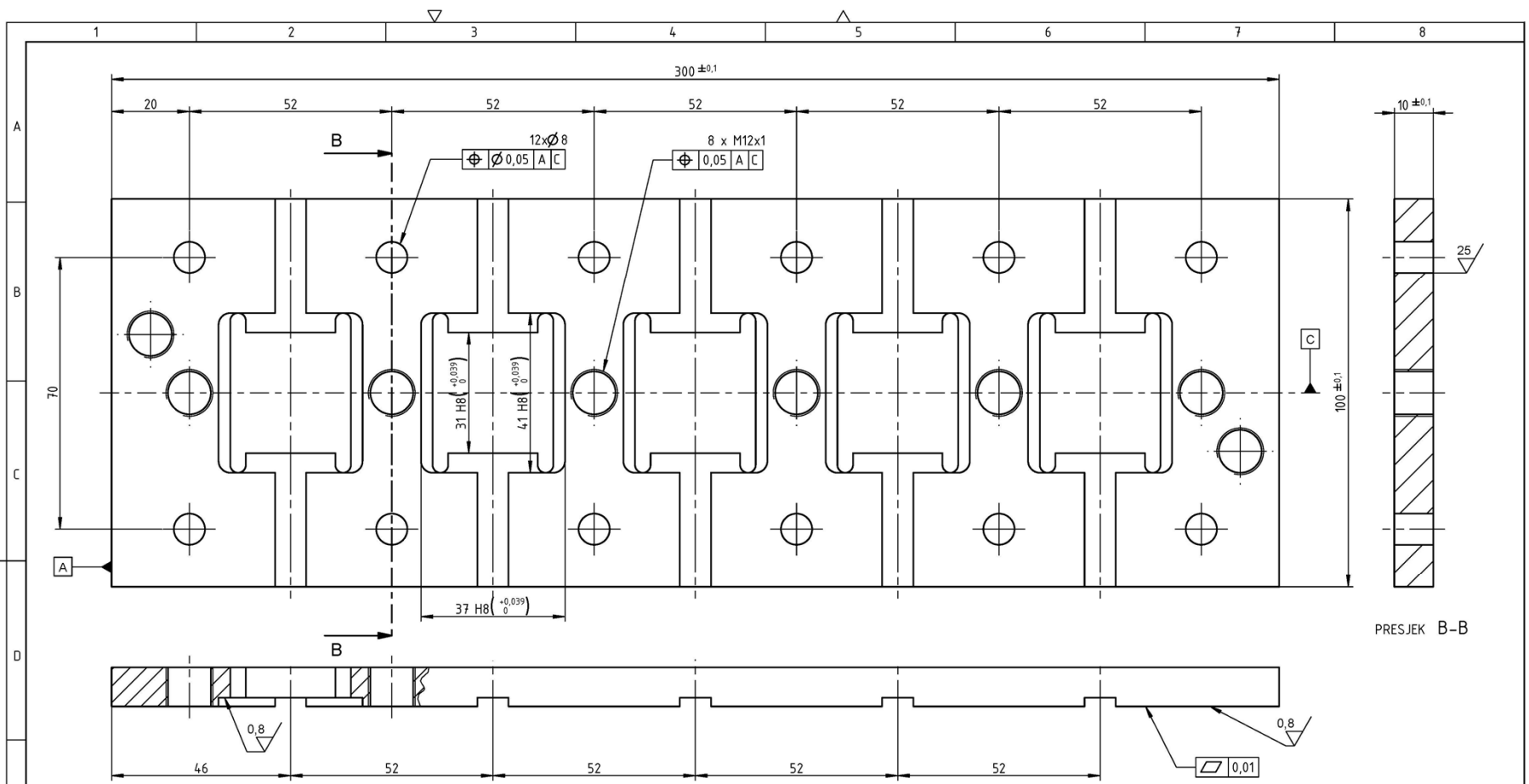
RJEŠAVANJE JEDNADŽBE EVOLVENTE				
α	α/rad	$F(\alpha)$	$F^2(\alpha)$	
3	0	0.000	-0.015	2.221292160000
4	1	0.017	-0.015	2.220763871956
5	2	0.035	-0.015	
6	3	0.052	-0.015	
7	4	0.070	-0.015	
8	5	0.087	-0.015	
9	6	0.105	-0.015	
10	7	0.122	-0.014	
11	8	0.140	-0.014	
12	9	0.157	-0.014	
13	10	0.175	-0.013	
14	11	0.192	-0.013	
15	12	0.209	-0.012	
16	13	0.227	-0.011	
17	14	0.244	-0.010	
18	15	0.262	-0.009	
19	16	0.279	-0.007	
20	17	0.297	-0.006	0.345660671354
21	18	0.314	-0.004	0.171691651025
22	19	0.332	-0.002	0.047914784148
23	20	0.349	0.000	0.000000001474
24	21	0.367	0.002	0.059579543249
25	22	0.384	0.005	0.265203411269
26	23	0.401	0.008	0.663121626151



$\alpha =$	30 °
$F(\alpha) =$	0.038847
$F^2(\alpha) =$	0.001509

Napredno modeliranje

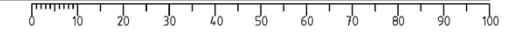




PRESJEK B-B

Nacrt s tolerancijama

Projektirao	Datum	Ime i prezime	Potpis	Sveučilište u Splitu FESB, Split
Razradio	30-Apr-17	Ivan Pivac		
Crtao	30-Apr-17	Istrazivacka grupa		
Pregledao	30-Apr-17	Ivan Pivac		
Objekt:		Stezna ploca		Objekt broj:
Napomena:				R.N. broj:
Materijal: SS316L		Masa: 0		Primjerak
Mjerilo: 1:1		Naziv: Stezna ploca		Format: A3
		Crtež broj:		Listova: 1
				List: 1



Design by CADLab

Povezivanje modeliranja i analize

The image shows a CAD software interface with a 3D model of a turbine blade. A Microsoft Excel spreadsheet titled 'Temperatura.xls' is linked to the model. The spreadsheet contains the following data:

Zagrijavanje blazinice			
Ulazni podaci			
Sila	$F =$	1000	N
Brzina vrtnje	$n =$	720	min^{-1}
Faktor trenja	$\mu =$	0.01	-
Koeficijent prijenosa	$k =$	15	$\text{W/m}^2\text{K}$
Promjer blazinice	$d =$	80	mm
Duljina blazinice	$b =$	80	mm
Rezultati			
Obodna brzina	$v =$	3.02	m/s
Površina izmjene	$A =$	0.020	m^2
Prirast temperature	$\Delta t =$	100.0	C

The 'Excel Analysis' dialog box shows the following setup:

- File: Temperatura.xls
- Creo Parametric to Excel:

Dimension/Paramet...	Value	Cell
SILA	1000.000000	\$D\$5
BRZINA_VRTNJE	720.000000	\$D\$6
FAKTOR_TRENJA	0.010000	\$D\$7
KOEF_PRIJENOSA_TOP...	15.000000	\$D\$8
- Excel to Creo Parametric: Output cells: D13:D15
- Results:

Cell name	Value
D13	3.015929
D14	0.020106
D15	100.000000

Povezivanje modeliranja i optimiranja

The image displays a 3D CAD model of a console (Konzola) and an Excel spreadsheet used for optimization. The Excel spreadsheet is titled "Konzola.xls" and contains the following data:

Cell	Value	Unit
D5	1000	N
D6	73100	N/mm ²
D7	2.78E-06	kg/mm ³
D8	5	mm
D9	2.5	-
D10	2000	mm
D11	48.65311	mm
D12	121.6328	mm
D15	32.90	kg
D18	-3.7E-07	mm
D19	0	-
D20	-48.6531	mm
D23	49	mm
D24	122	mm

The CAD software interface shows the 3D model of the console with dimensions and a coordinate system. The model is labeled "Konzola" and "PRT_CSYS_DEF". The coordinate system axes are labeled "FRONT", "TOP", and "PRT_CSYS_DEF". The Excel spreadsheet is linked to the CAD software via an "Excel Analysis" dialog box, which shows the following setup:

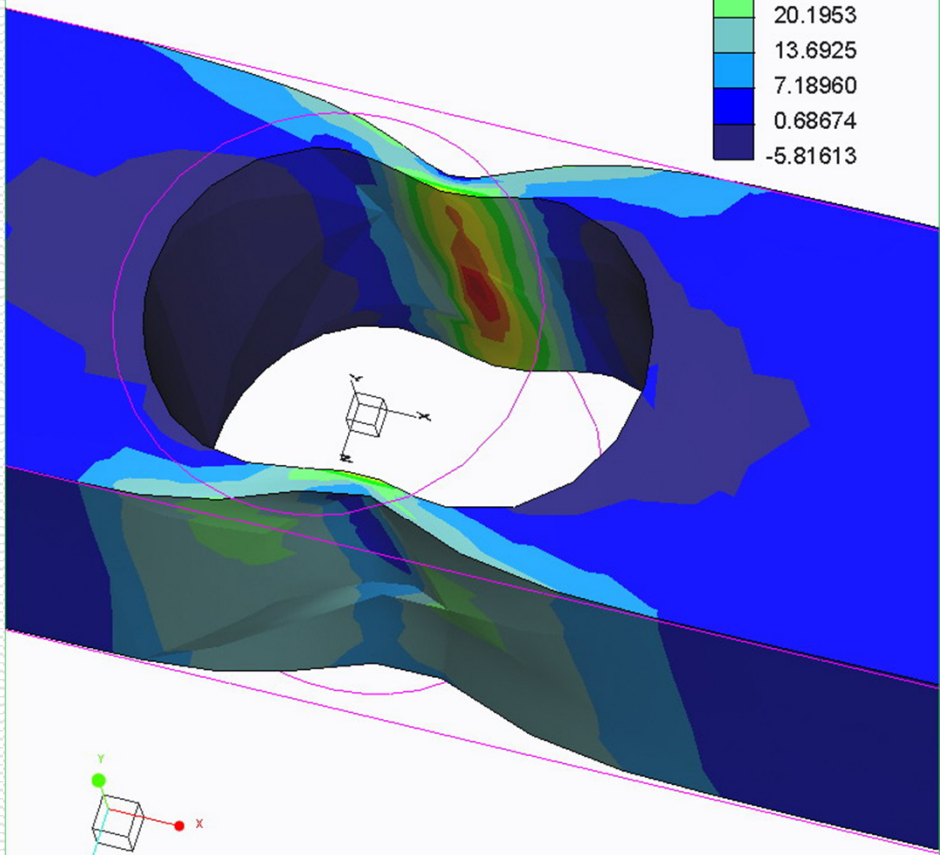
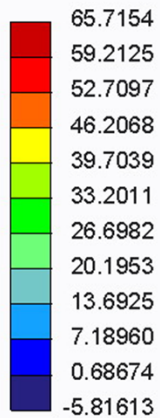
Dimension/Parameter	Value	Cell
SILA	1000.000000	D5
MODULE	73100.000000	D6
GUSTOCA	0.000003	D7
d7	2000.000000	D10

The "Excel to Creo Parametric" section shows the output cells: D15, D23, D24. The "Results" section shows the following values:

Cell name	Value
D15	32.903046
D23	49.000000
D24	122.000000

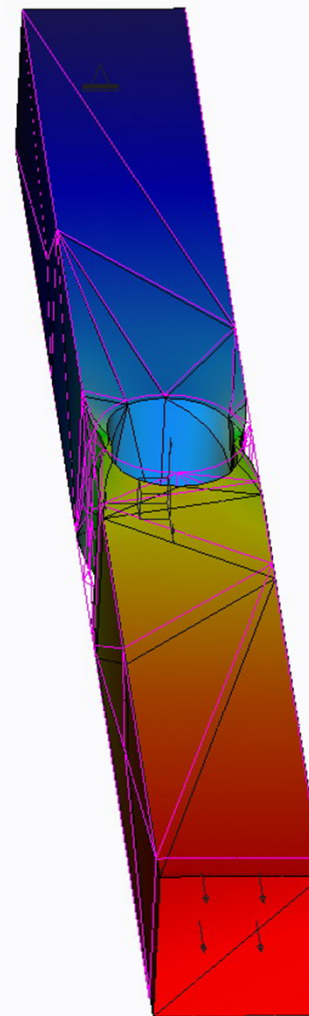
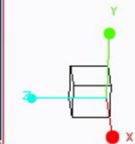
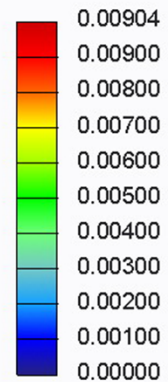
Temeljni pojmovi strukturne analize

Frame 5 of 8
Stress XX (WCS)
(MPa)
Deformed
Scale 1.6602E+03
Loadset:MyLoadSet : STAP



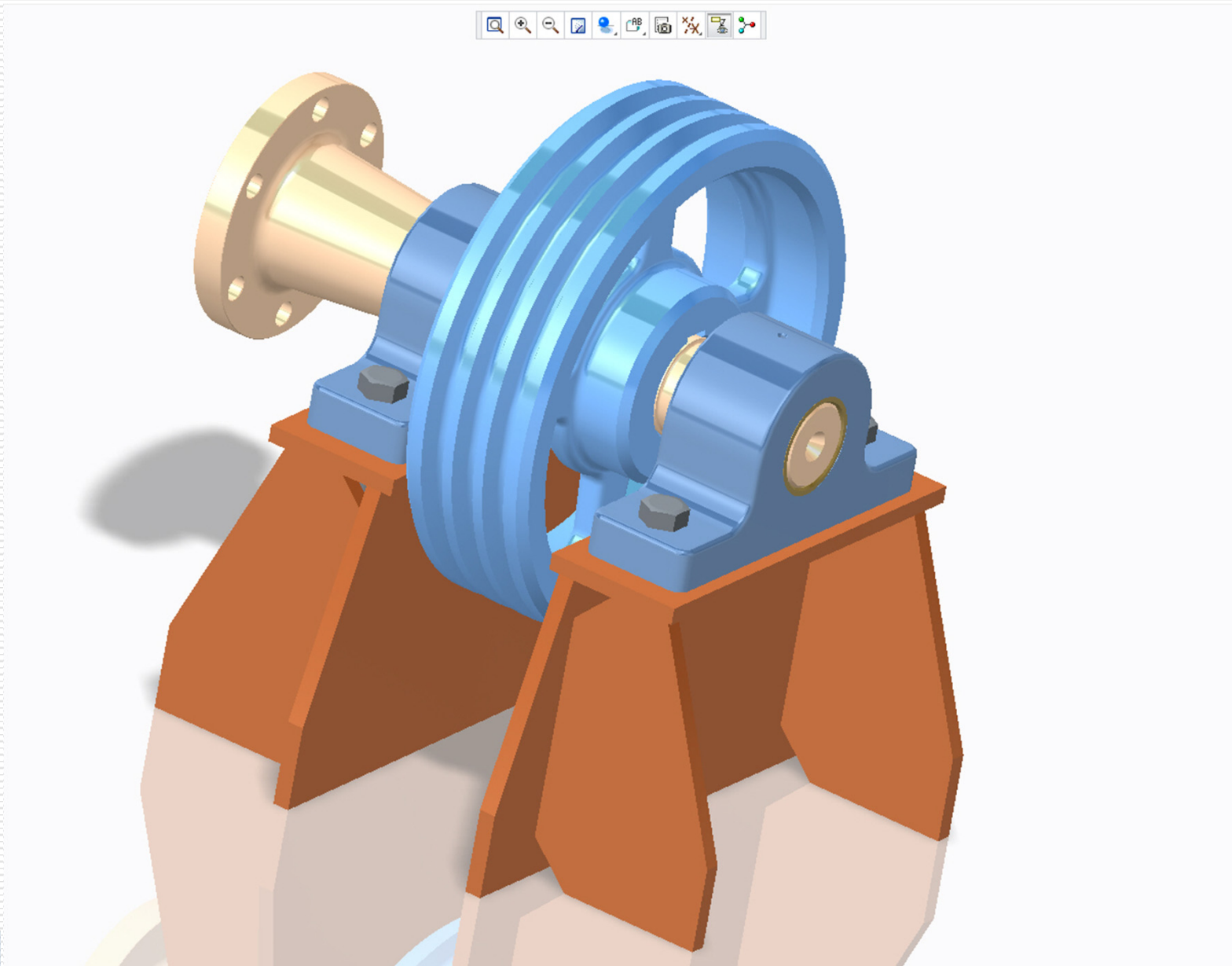
"Window1" - StaticAnalysis - StaticAnalysis

Frame 5 of 8
Displacement Mag (WCS)
(mm)
Deformed
Max Disp 9.0352E-03
Scale 1.1068E+03
Loadset:MyLoadSet : STAP



"Window2" - StaticAnalysis - StaticAnalysis

Geometrijsko modeliranje – projekt



Sretno!

