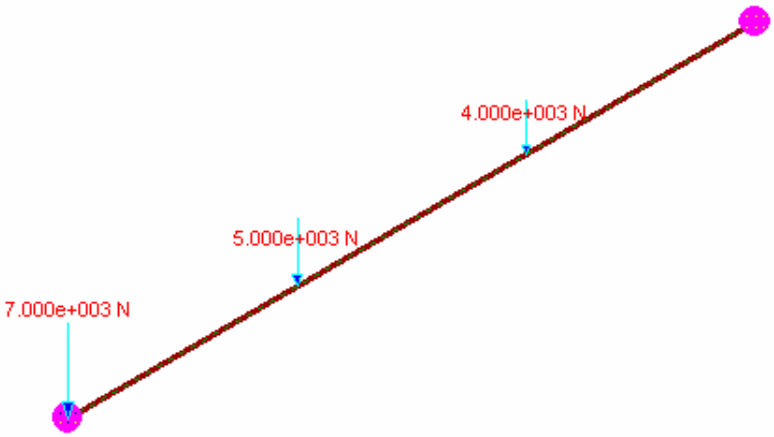
TEST SCHEDULE CASTALIA_STAT004BIS		
SOLVING	BEAM PROBLEM	**SOL.SAR.STAT004BIS**
FINITE ELEMENT	SOLVER	**CLEVER (SARGON ©)**



Problem description:

Cantilever with end and internal shear forces

Keywords (english): validation, benchmark, statics, finite elements, fem, solver, precision, reliability, quality control, beam, error measure

Keywords (italian): validazione, benchmark, statica, elementi finiti, fem, solutore, precisione, affidabilità, controllo qualità, travi, misura di errore

Editorial note:

Target values are based on theoretical values, cross check values or accepted values. Where “theoretical” values are used, target values have been computed using well known formulae and/or published results.

Note:

Shear area is not used, that is shear energy neglected. Dxi and Dzi are the offsets from lower Z alignment leftmost available node.

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GEOMETRY & CONSTRAINTS				
Full Length [mm]	Dx1 [mm]	Dx2 [mm]		Constraints
3000	1000	2000	-	As shown

LOAD		
Type	Value	Point of application
NODAL FORCE	7.000e+003	Free tip
force concentrated	4.000e+003	Dx1
force concentrated	5.000e+003	Dx2
		-

MATERIAL						Fe360
f_y [N/mm^2]	f_u [N/mm^2]	E [N/mm^2]	*v*	α		
2.350e+002	3.600e+002	2.060e+005	3.000e-001	1.200e-005		

CROSS-SECTION					IPE200
A [mm^2]	J_2[mm^4]	J_3 [mm^4]	J_t [mm^4]	W_2 [mm^3]	W_3 [mm^3]
2.981e+003	2.051e+007	1.540e+006	6.254e+004	2.051e+005	3.081e+004
W_{pl2} [mm^3]	W_{pl3} [mm^3]	i_2 [mm]	i_3 [mm]	i_t [mm]	
2.597e+005	4.776e+004	8.296e+001	2.273e+001	2.887e+001	

OTHER DATA					

TARGET VALUES vs COMPUTED VALUES

Description	T_v	T_{vK}	C_v	$(C_v - T_v)$	$100\frac{T_v - C_v}{C_v}$
Shear T3, I extreme. Beam # 1. Load case # 1	1.6000e+004	Th	1.6000e+004	**-5.4570e-012**	**-0.0000**
Shear T3, J extreme. Beam # 1. Load case # 1	-7.0000e+003	Th	-7.0000e+003	**5.4570e-012**	**-0.0000**
Bending M2, I extreme. Beam # 1. Load case # 1	-3.5000e+007	Th	-3.5000e+007	**-1.0000e-001**	**0.0000**
Bending M2, J extreme. Beam # 1. Load case # 1	0.0000e+000	Th	3.7253e-009	**3.7253e-009**	**0.0000**

Cv computed value
Tv target value
TvK target value kind (theoretical, cross check, accepted).
- Th theoretical value
- Cr cross check value (theoretical target value is not known, results obtained with a different program are used as target values).
- Ac accepted value (a value which, on the basis of some argument, can be considered acceptable).

100(Cv – Tv) / Tv relative error percentage

Computational notes:

Authors: Ing. Marco Croci, Ing. Paolo Rugarli
Computed errors: checksolvers.exe, by Castalia srl.