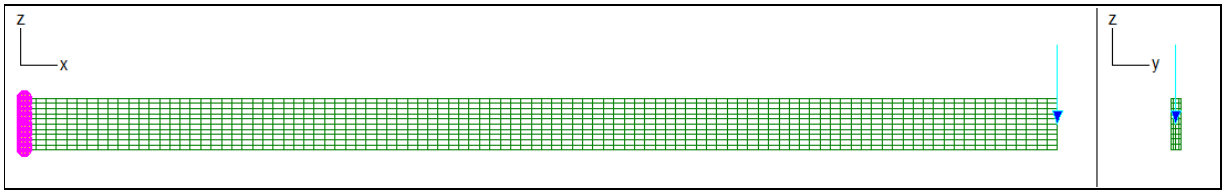
Validation of Sargon Nonlinear solver (CURAN, version 9.60)			
TEST SO002	**VALIDATION, CROSS CHECKS, RELIABILITY, BENCHMARK**	**Marco Croci**	**30/11/2010**



Test description
Constitutive law of membranes material: linear elastic. Solution should coincide with a linear elastic solution.
Theoretical check and cross-check with Sargon linear solver (CLEVER)
Test model: **curanSO_002.WSR** Target model: **C002SO_CLEVER.WSR**

Material properties		
Name	ν	E
S235LE	0,3	210000N/mm^2

Model data

Beam			**Constraints**		**Load (z direction)**	
LENGTH	HEIGHT	THICKNESS	LEFT	RIGHT	APPLICATION POINT	FORCE
10000mm	500mm	100mm	Fixed	Free	Right end	-100000N

Solid elements	Type	d.o.f.
4000 (100x10x4)	BRICK8	16500

CROSS CHECK

Displacement in the middle of the beam is $\delta=FL^3/3EI+L\chi T/2GA$ where χ is shear factor and T is internal shear force

Load case	**Value**	**Unit**	**CURAN**	**TARGET**	**KIND**	**% diff.**
1	Node 2844 displacement (z)	mm	-1,497E+02	-1,524E+02	theoretical	-1,76
1	σ_{VM} element 3027, node 3393	N/mm^2	1,951E+02	1,951E+02	cross-check	0,00
1	τ_{zx} element 3027, node 3393	N/mm^2	-1,550E+01	-1,550E+01	cross-check	0,00

% difference = (CURAN - TARGET) / TARGET * 100

Precision of limit multiplier for the analysis: 0.005
BRICK8: trilinear isoparametric element