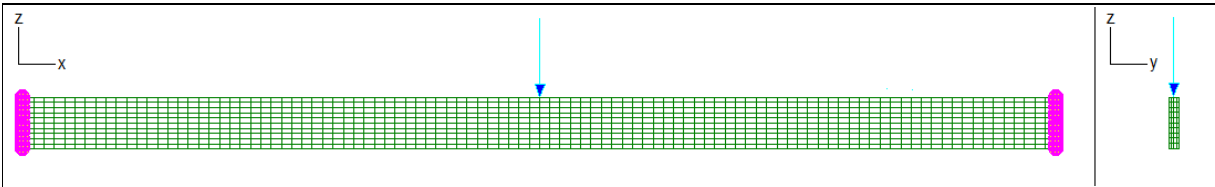


Validation of Sargon Nonlinear solver (CURAN, version 9.70)			
TEST SO008	VALIDATION, CROSS CHECKS, RELIABILITY, BENCHMARK	Marco Croci	Rev.2-11/04/2011



Test description	
Constitutive law of solids material: linear elastic. Solution should coincide with a linear elastic analysis solution.	
Cross-check solver: CLEVER (Sargon)	
Test model: curanSO_008.WSR	Target model: C008SO_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	Fixed	Middle point	-100000N

Solid elements	Type	d.o.f.
4000 (100x10x4)	BRICK8WI	16335

CROSS CHECK

Displacement in the middle of the beam is $\delta = FL^3/192EI + L\chi T/2GA$ where χ is shear factor and T is internal shear force

Load case	Value	Unit	CURAN	TARGET	KIND	% diff.
1	Node 2348 displacement (z)	mm	-2,430E+00	-2,455E+00	theoretical	-1,03
1	σ_x element 2048, node 2324	N/mm ²	1,616E+01	1,615E+01	cross-check	0,06
1	τ_{xx} element 2048, node 2324	N/mm ²	-2,762E-01	-2,762E-01	cross-check	0,00
1	Node 2448 reaction (x)	N	-1,954E+04	-1,954E+04	cross-check	0,00

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

Precision of limit multiplier for the analysis: 0.005
 BRICK8WI: isoparametric element with Wilson-Ibrahimbegovic modification