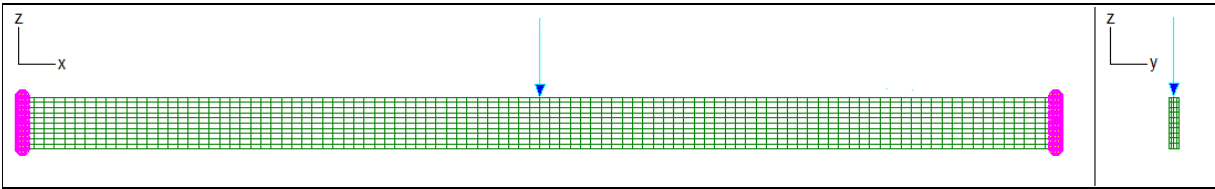


Validation of Sargon Nonlinear solver (CURAN, version 9.60)			
TEST SO007	VALIDATION, CROSS CHECKS, RELIABILITY, BENCHMARK	Marco Croci	30/11/2010



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_007.WSR	Target model: C007SO_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)	BRICK8SRI	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	-2,428E+00	-2,455E+00	theoretical	-1,11
1	σ_x element 2048, node 2324	N/mm ²	1,651E+01	1,651E+01	cross-check	0,00
1	τ_{zx} element 2048, node 2324	N/mm ²	-2,782E-01	-2,782E-01	cross-check	0,00

$$\% \text{ difference} = (\text{CURAN} - \text{TARGET}) / \text{TARGET} * 100$$

Precision of limit multiplier for the analysis: 0.005
 BRICK8SRI: trilinear isoparametric element with reduced integration