

SSNV200 - Tensile test shearing with the model VISC_TAHERI

Summary:

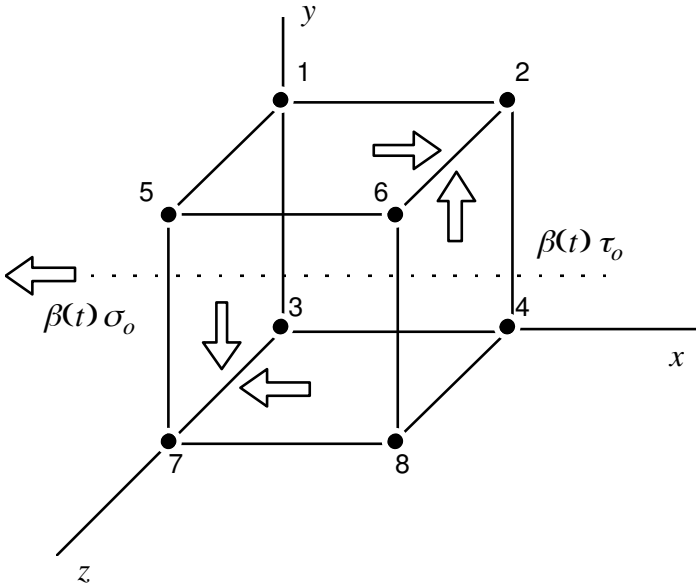
The problem is quasi-static nonlinear in mechanics of the structures.

One analyzes the response of an element of volume to a loading in traction-shearing, carried out in such way that imposes a state of uniform stress-strain in the element. There is only one modeling 3D voluminal.

This test is inspired by the SSNV102, which tests the behavior of TAHERI in elastoplasticity. Here, one takes into account viscosity.

1 Problem of reference

1.1 Geometry



Face YZ : (1, 3, 5, 7)

Face XZ : (3, 4, 7, 8)

Face 1YZ : (2, 4, 6, 8)

Face 1XZ : (1, 2, 5, 6)

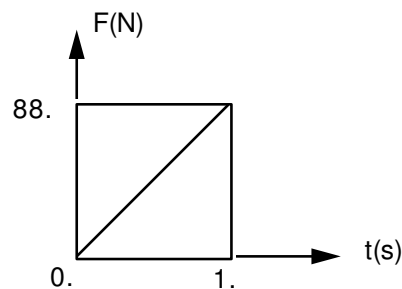
$\beta(t) \tau_o$ cisaillement imposé Face 1XZ
Face 1Y Z
 $\beta(t) \sigma_o$ pression imposée Face YZ
 $\beta(t)$ fonction d'effort

1.2 Material properties

isotropic elasticity	$E = 200\,000 \text{ MPa}$	$\nu = 0,3$		
plasticity Taheri	Saïd $C_{inf} = 0.065 \text{ MPa}$	$C_1 = -0.012 \text{ Mpa}$	$s = 450$	$b = 30$
	$m = 0.1$	$a = 312$	$\alpha = 0.3$	$R_o = 72$
Viscosity: LEMAITRE	$N = 11$	$UN_SUR_K = 3.28410E-04$	$UN_SUR_M = 0.17857$	

1.3 Boundary conditions and loadings

N04	$dx = dy = 0$	Face YZ :	$FX = FY = -F(t)$
N08	$dx = dy = dz = 0$	Face XZ :	$FX = -F(t)$
N02 , N06	$dx = 0$	Face 1YZ :	$FY = F(t)$
		Face 1XZ :	$FX = F(t)$



1.4 Initial conditions

Worthless constraints and deformations with $t=0$.

2 Reference solution

2.1 Method of calculating used for the reference solution

The test is of nonregression. One thus notes the values obtained by *Code_Aster*, with version 5.10

2.2 Results of reference

Values of $\varepsilon, \gamma, \varepsilon_p, \gamma_p, p$ and σ_p with the nodes with $t=1$ s.

2.3 Bibliographical references

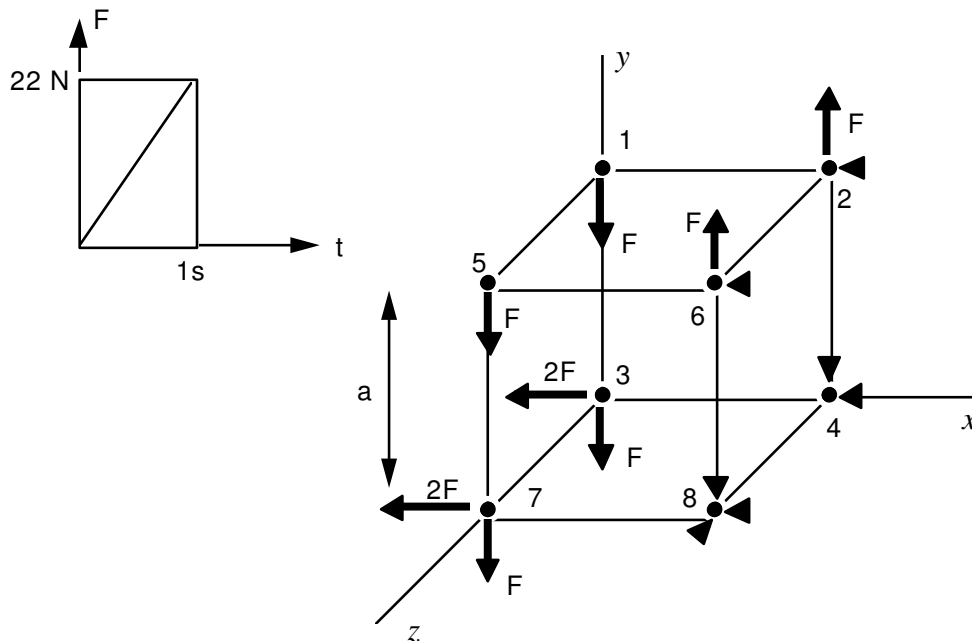
1. S. ANDRIEUX - P. SCHOENBERGER - S. TAHERI: With three dimensional cyclic constitutive law for metals with has semi-discrete memory variable - HI - 71/8147 (1992)
2. P. GEYER - J.M. PROIX - P. SCHOENBERGER - S. TAHERI: Modeling of the phenomena of progressive deformation - Collection of the internal notes of DER 93NB00153

3 Modeling A

3.1 Characteristics of modeling

Modeling 3D :

Cubic elementary with a grid using a hexahedron with 8 nodes.



3.2 Characteristics of the grid

1 mesh HEXA8, width side $a=1$.

3.3 Sizes tested and results

Identification	Reference	Aster	% difference
in all nodes			
ε	2.10^{-5}	2.10^{-5}	0
γ	$2,610^{-5}$	$2,610^{-5}$	0
ε_p	0.	0.	0
γ_p	0	0	0
p	0	0	0
σ_p	64.8	64.8	0

3.4 Remarks

The loading used here does not reveal of plasticization, whereas without viscosity, this same loading leads the structure in elastoplastic mode.

The test concerning the value σ_p rigorously do not give the same value on all the machines (need for `TOLE_MACHINE`). This problem is related to a function having a vertical tangent (power 0.3) which appears in the law of behavior. See the comment in the file `ssnv200a.comm`.

4 Summary of the results

This test of nonregression allows a minimal checking of the good performance of the model `VISC_TAHERI`. He would ask to be supplemented by a test implementing a true reference solution.