SSNV200 - Traction test shears with the model VISC_TAHERI

Summarized:

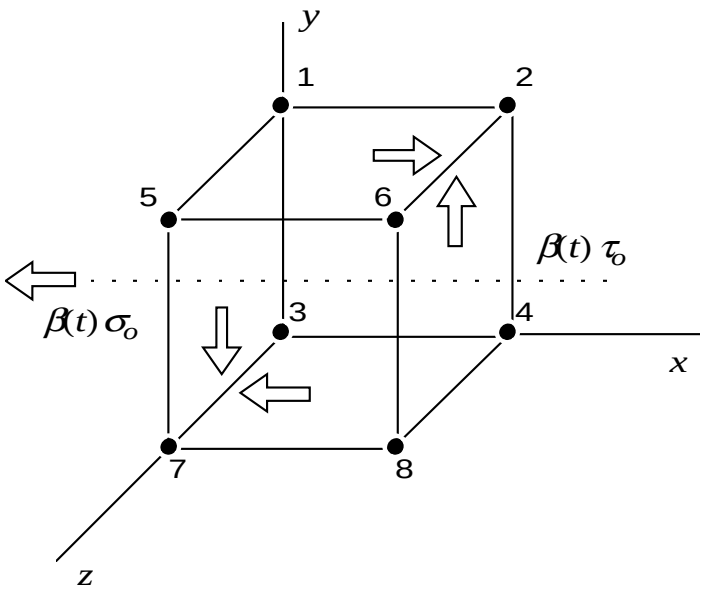
The problem is quasi-static nonlinear in structural mechanics.

One analyzes the response of a volume element with a loading in tension-shears, carried out in such way that imposes a state of uniform stress-strain in the element. There is only one modelization 3D voluminal.

This test is inspired by the SSNV102, which tests the behavior of TAHERIi 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 1 X Z / Face 1 Y Z

$\beta(t)\ \sigma_o$ pression imposée Face YZ

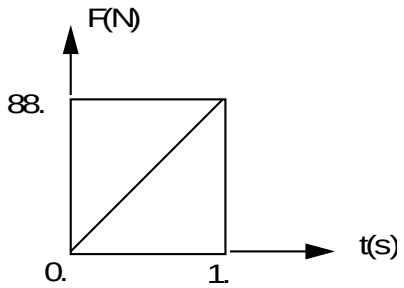
$\beta(t)$ fonction d'effort

1.2 Material properties

isotropic elasticity		$E=200\,000\ MPa$	$\nu=0,3$		
plasticity	Saïd Taheri	$C_{inf}=0.065\ MPa$	$C_1=-0.012\ Mpa$	$s=450$	$b=30$
		$m=0.1$	$a=312$	$\alpha=0.3$	$R_o=72$
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 Forced

initial conditions and null strains with $t=0$.

2 Reference solution

2.1 Method of calculating used for the reference solution

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

2.2 Results of reference

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

2.3 Bibliographical references

1.S. ANDRIEUX - P. SCHOENBERGER - S. TAHERI: A three dimensional cyclic constitutive law for metals with has variable semi-DISCRET memory - HI - 71/8147 (1992)

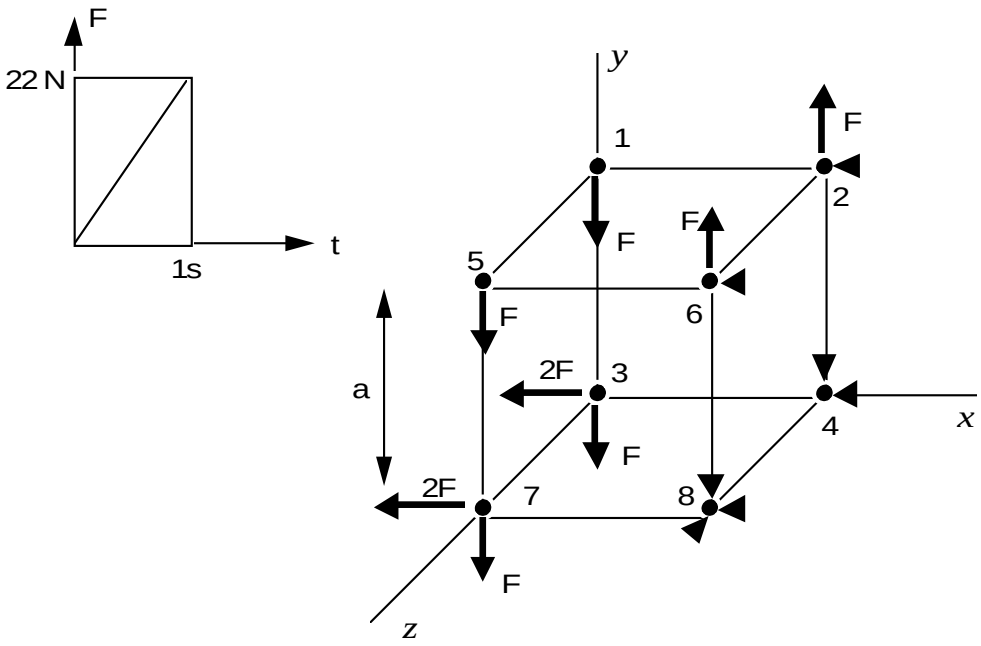
2.P. GEYER - J.M. PROIX - P. SCHOENBERGER - S. TAHERI: Modelization of the phenomena of progressive strain - Collection of the internal notes of DER 93NB00153

3 Modelization A

3.1 Characteristic of the modelization

Modelization 3D :

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



3.2 Characteristics of mesh

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

3.3 Quantities 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 structure in elastoplastic mode.

4 Summary of the results

This test of non regression allows a minimal checking of the correct operation of model VISC_TAHERI. He would ask to be supplemented by a test implementing a true reference solution.