

SSND109 - Cyclic loading on a Summarized

monocrystal:

One presents here a test of traction and compression on a material point with behavior `MONOCRISTAL` . The family of sliding systems is octahedral.

The modelization A validates implicit integration and clarifies (Runge-Kutta) by comparison with the solution obtained using Zmat.

1 Problem of reference

1.1 Geometry

the geometry is that of a material point.

1.2 Material properties

Young's modulus: $E = 190000 \text{ MPa}$

Poisson's ratio: $\nu = 0.3$

Modelization a:

MONO_VISC1: $N=10 \quad K=10 \quad C=100000$

MONO_ISOT1: $R_0=40 \quad b=5 \quad Q=0 \quad H=0$

MONO_CINE1: $D=4150$

1.3 Boundary conditions and loadings

the loading consists of a cycle of strain imposed according to x :

with $t=0$, $\varepsilon_{xx}=0$

with $t=0.5$, $\varepsilon_{xx}=0.002$,

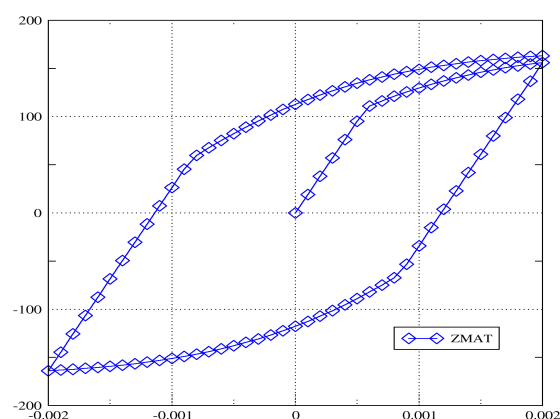
with $t=1.5$, $\varepsilon_{xx}=-0.002$

with $t=2.5$, $\varepsilon_{xx}=0.002$

2 Reference solution

It acts of the solution obtained with Zmat. The extreme points of the cycle are:

INSTS	EPSILON_XX	SIG_XX_ZMAT
5.00000E-01	2.00000E-03	1.56115E+02
1.50000E+00	-2.00000E-03	-1.63886E+02
2.50000E+00	2.00000E-03	1.63182E+02



3 Modelization A

3.1 Characteristic of the modelization

Material point (use of SIMU_POINT_MAT). Two methods of resolution are tested:

- IMPLICIT
- RUNGE_KUTTA

3.2 Quantities tested and implicit

Integration results

Identification	Time	implicit	Reference Aster	% difference
σ_{xx}	0.5	156.115	156.115	0
σ_{xx}	1.5	-163.886	-163.886	0
σ_{xx}	2.5	163.182	163.182	0

Integration clarifies (Runge-Kutta)

Identification	Urgent	Reference	Aster clarifies	% difference
σ_{xx}	0.5	156.115	156.211	0.1,1,5
σ_{xx}	1.5	-163.886	-163.974	0.1,2,5
σ_{xx}	2.5	163.182	163.281	0.1

4 Summary of the results

This test in NON-regression makes it possible to validate by comparison with another software behavior MONOCRISTAL under cyclic loading.