PYNL01 - Integration of the behavior VMIS_ISOT_LINE by the order CALCULATION

Summary:

The purpose of this document is to validate the order CALCULATION for the integration of law of behavior.

1 Problem of reference

1.1 Geometry

One considers a unit cube length ($1\mathrm{m}$).

1.2 Properties of material

One considers a material with a law of behavior of Von Mises with linear isotropic work hardening (VMIS_ISOT_LINE).
The elastic properties are the following ones:
•Young modulus: $E=210\,000\,MPa$
•Poisson's ratio: $\nu=0,3$
The tangent module is worth: $E_t=1930\,MPa$.
The elastic limit is worth: $\sigma_y=181\,MPa$.

1.3 Boundary conditions and loadings

The lower face (in the plan $z=0$) is embedded.
The higher face (in the plan $z=1$) is subjected to a displacement $du=\begin{pmatrix}1\\1\\1\end{pmatrix}[m]$.

2 Reference solution

The reference solution is obtained by a digital resolution of the problem (elastic prediction then integration of the behavior) using the order STAT_NON_LINE. One thus obtains the stress field, the field of internal variables and the vector of nodal forces following the prediction.

3 Modeling A

3.1 Characteristics of modeling

In this modeling, the order is replaced STAT_NON_LINE by burst orders, which carry out the elastic prediction then the integration of the behavior.

3.2 Characteristics of the grid

The grid is composed of only one nets HEXA8.

3.3 Sizes tested and results

One tests the difference between the stress field (respectively the field of internal variables and the vector of the nodal forces) calculated by STAT_NON_LINE and that calculated by the order CALCULATION, after the prediction.

Identification	Reference	% difference
$min(\Delta\sigma)$	0	0
$max(\Delta\sigma)$	0	0
$min(\Delta vi)$	0	0
$max(\Delta vi)$	0	0
$min(\Delta f)$	0	0
$max(\Delta f)$	0	0

4 Summary of the results

This test made it possible to validate the order CALCULATION for the integration of the law of behavior of Von Mises with linear isotropic work hardening.