

HSNV131 – Validation of Summarized

INCLUDE_MATERIAU:

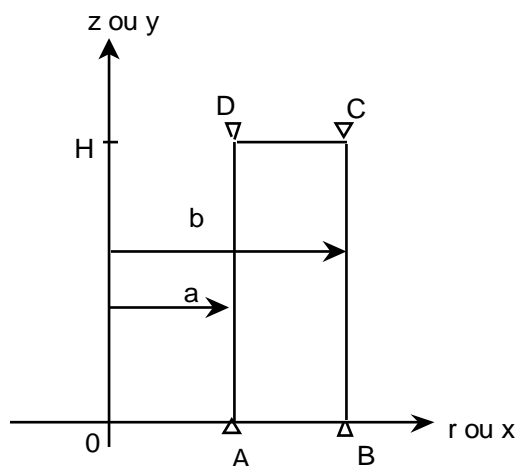
This test treats the thermoplasticity of Von Mises with isotropic hardening on a two-dimensional problem (modelization A in plane stresses).

The goal of the test (resulting from HSNV100) is to validate the extraction of the characteristics material via the catalog material. All the coefficients material vary with the temperature.

1 Problem of reference

1.1 Geometry

Rolls axisymmetric (modelization A) or rectangular plate (modelization B) or right pipe (modelizations C and D)



1.1-a Appears: Geometry of the structure

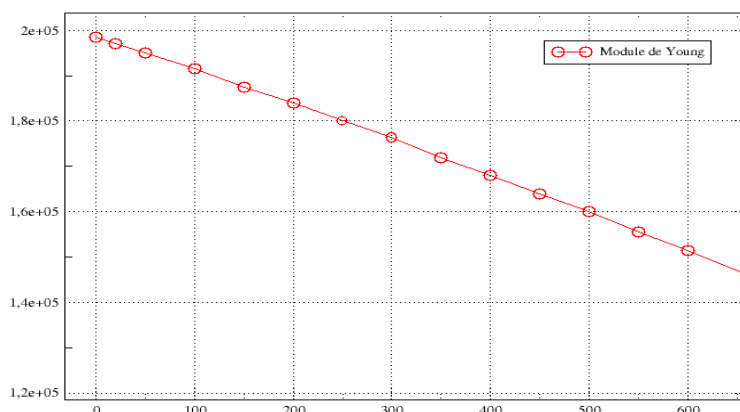
interior Radius: $a = 1 \text{ mm}$

external radius: $b = 2 \text{ mm}$ (width $AB : 1 \text{ mm}$)

height: $H = 4 \text{ mm}$

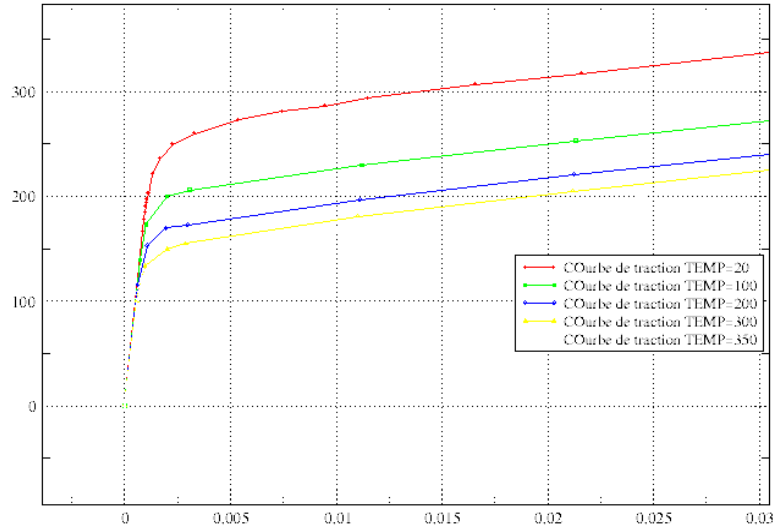
1.2 Property of the materials

the Young modulus varies according to the temperature in the following way:



The Poisson's ratio is constant and is worth 0.3 .

Curves of tension vary according to the temperature in the following way:



1.3 Boundary conditions and loadings

Modelization A in plane stresses: $u_y=0$ on the sides AB and CD , $u_x=0$ in A
linear Variation of the temperature (uniform): $T_0=25^\circ C$, $T(100)=100^\circ C$

The initial temperature is of $25^\circ C$,

the reference temperature is of $25^\circ C$.

2 Reference solution

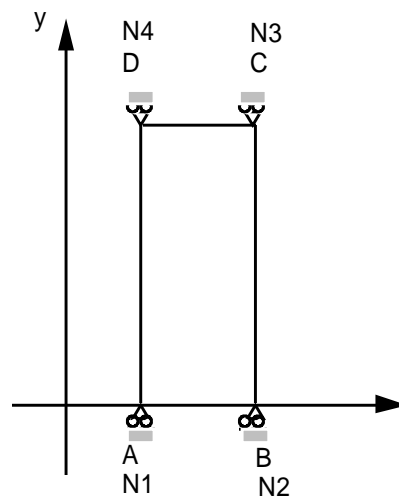
2.1 Méthode de calcul used for the reference solution

Test of non regression

3 Modelization A

3.1 Characteristic of modelization

QUAD4 - Plane stresses



Appears 5.1-a: Modelization A

3.2 Characteristic of the mesh

Many nodes: 4
Number of meshes and types: 1 QUAD4, 4 SEG2

3.3 Quantities tested and Variable

results	Urgent (s)	Aster
Temperature	$t=0$	25
	$t=66.666$	75
	$t=80$	85
	$t=85$	88.75
	$t=90$	92.5
p	$t=66.666$	9.60025 10 ⁻⁶
	$t=80$	7.13868 10 ⁻⁵
	$t=90$	1.50304 10 ⁻⁴
σ_{yy}	$t=66.666$	-1.51658 10 ²
	$t=80$	-1.70452 10 ²
	$t=90$	-1.78346 10 ²

4 Summary of the results

This test of non regression makes it possible to validate the extraction of the characteristics material on a thermoplastic problem.