ARTS ET MÉTIERS ParisTech

Campus d'Angers

Prise en main d'ABAQUS
Essai de traction

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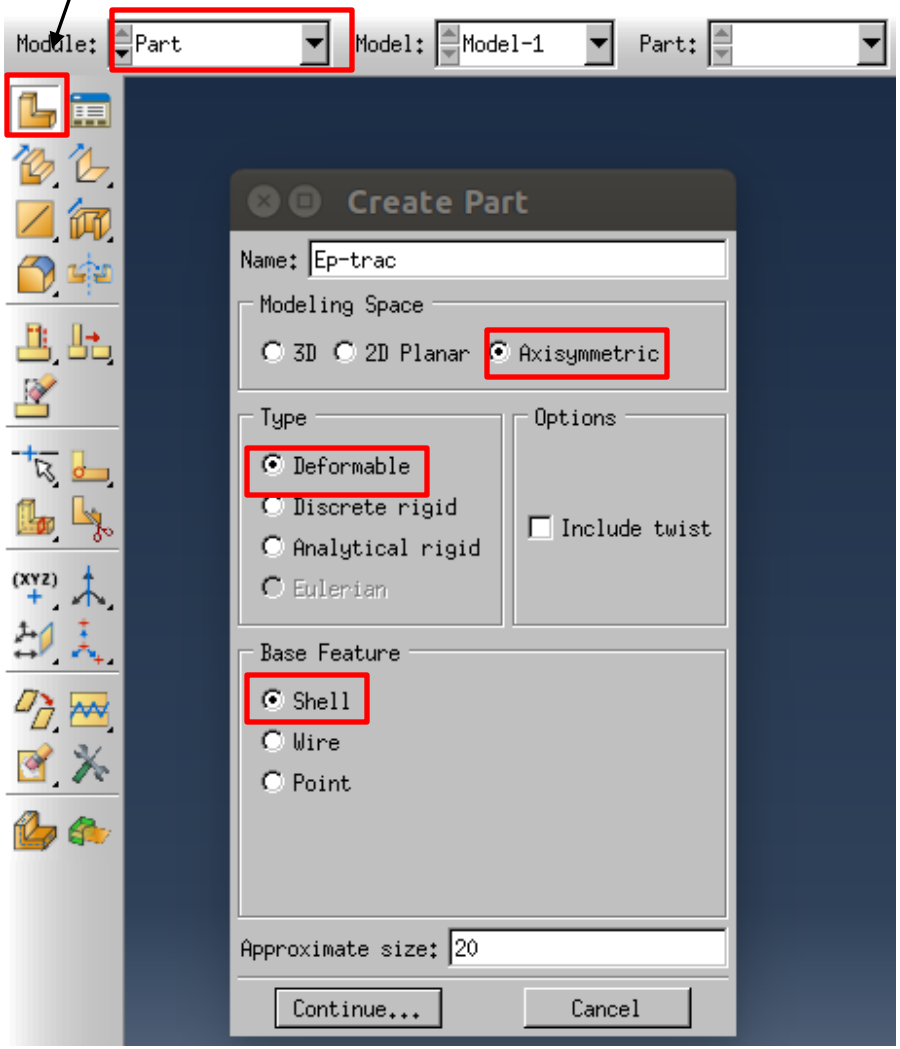
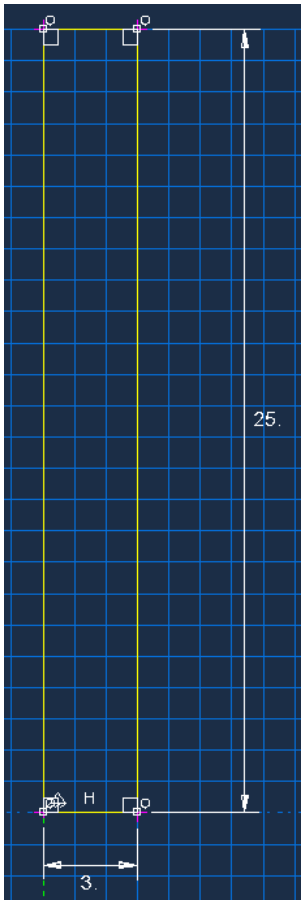
Cliquer sur « Create Part »

Sélectionner « Axisymetric », « Deformable » et « Shell »

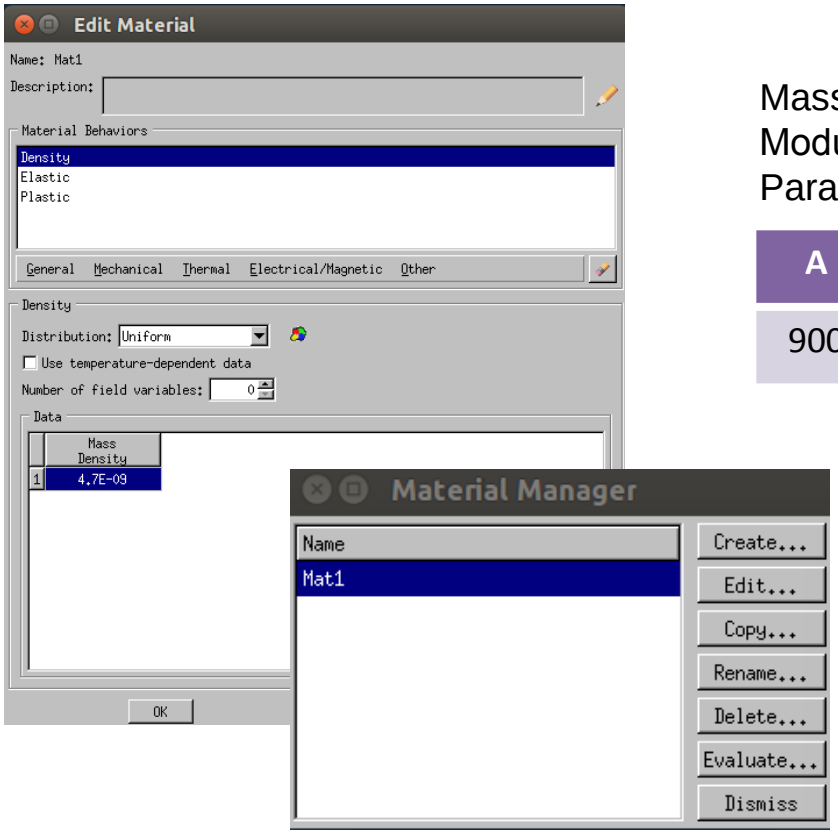


Dessiner l'éprouvette avec les dimensions suivantes:



Cliquer sur « Create material »

-Introduire la valeur de la densité via le menu « General »
-Introduire la valeur du module d'élasticité et les paramètres de la loi de comportement via le menu« Mechanical »

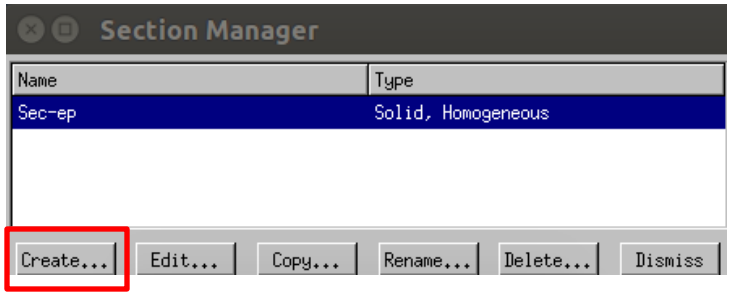


Masse volumique : 4700 Kg/m3
Module d'Young : 111 GPa
Paramètres de la loi de Johnson-Cook

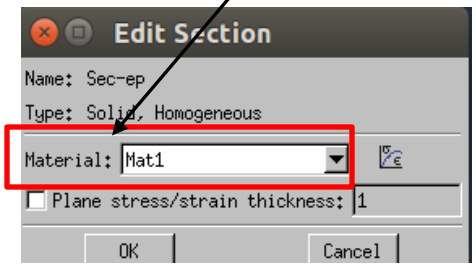
A	B	n	T_{fusion}	$T_{ambiante}$
900	550	0.26	1650	25

Création d'une section

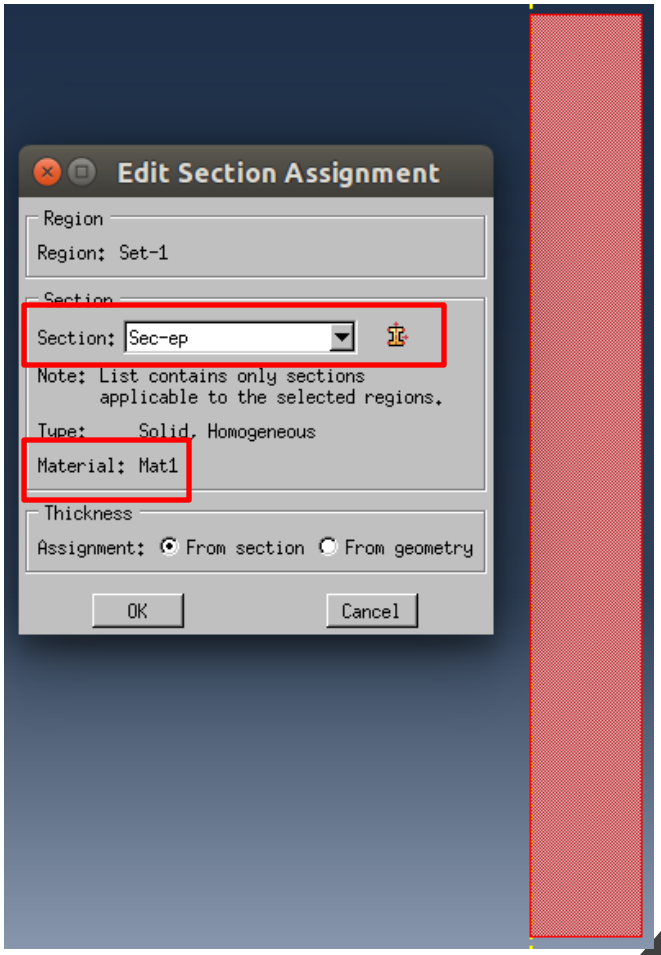
Cliquer sur « Create section »

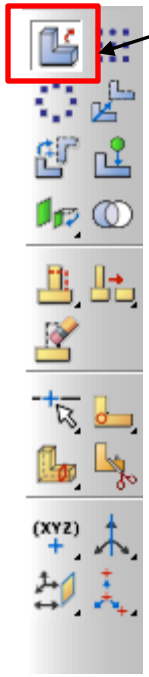


Choisir le matériau affecté à cette section

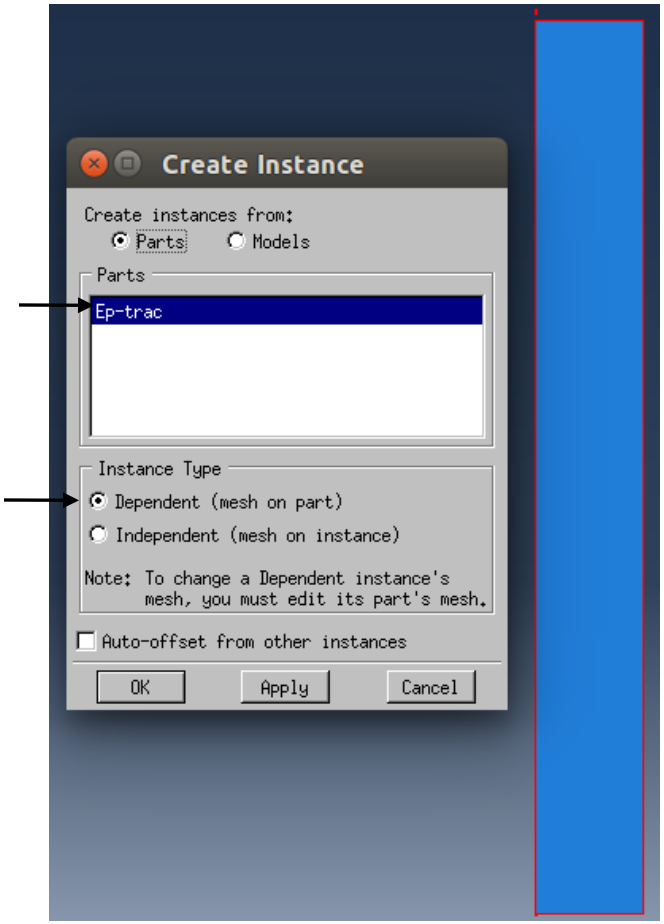


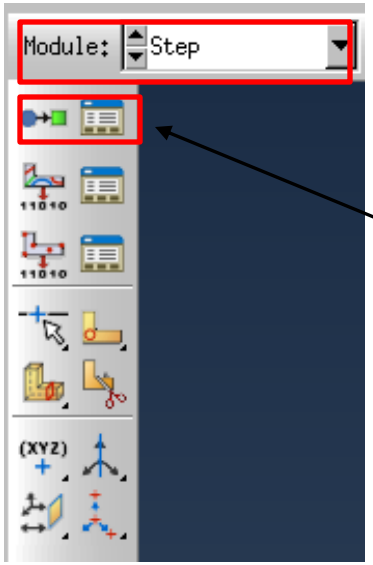
Affectation d'une section



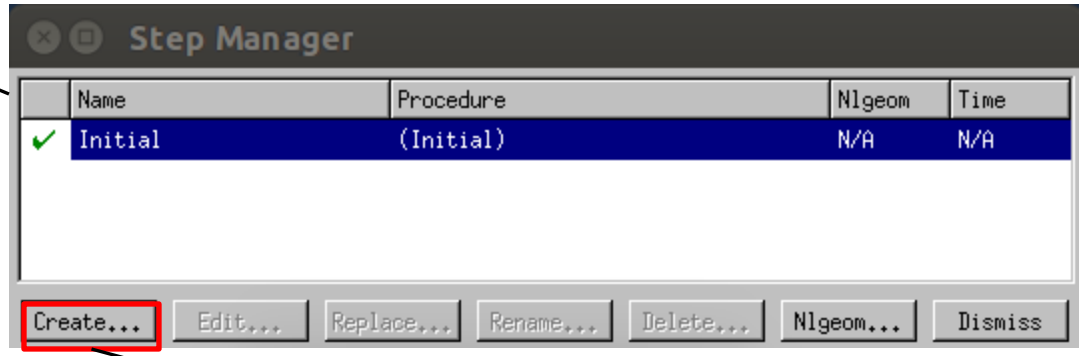


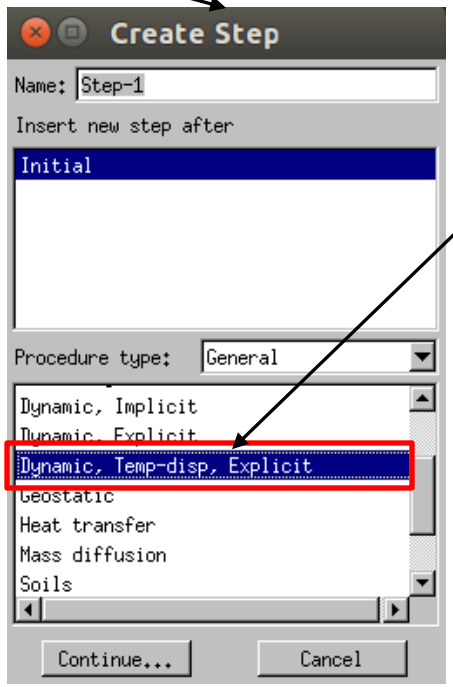
Cliquer sur « Create Instance »





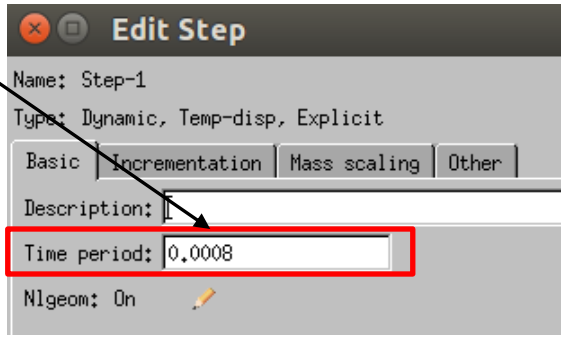
Cliquer sur « Step Manager »
Cliquer sur « Create »

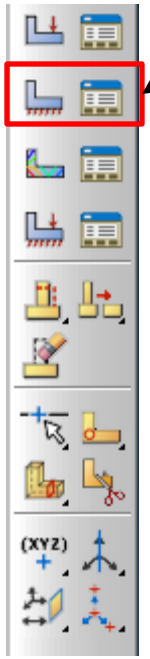




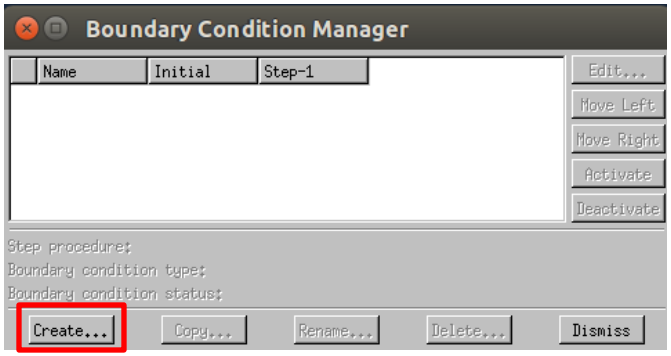
Choisir « Dynamic, Temp-disp, Explicit »

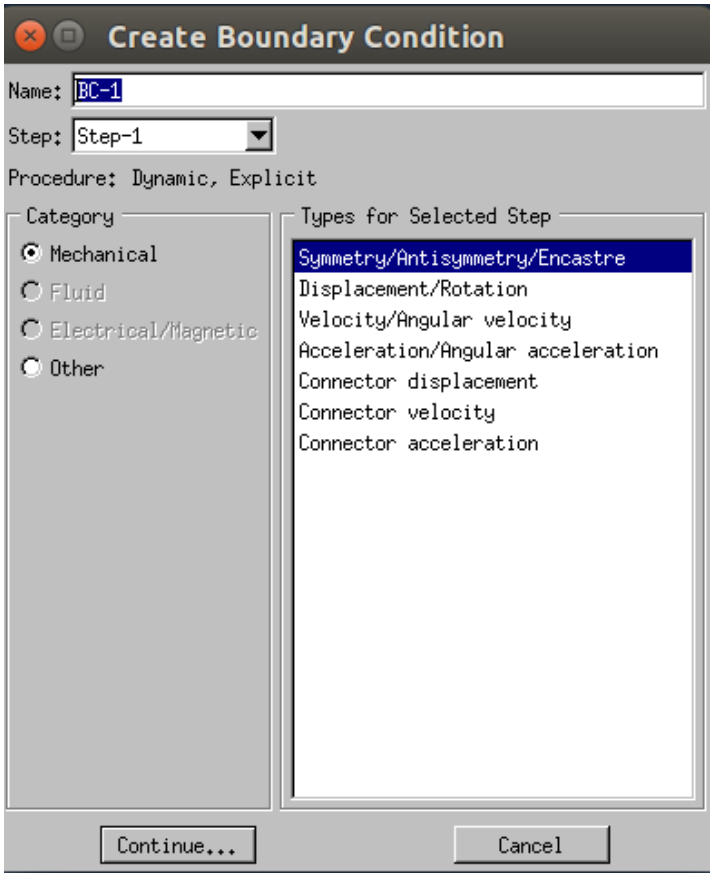
Modifier le temps du « Step »



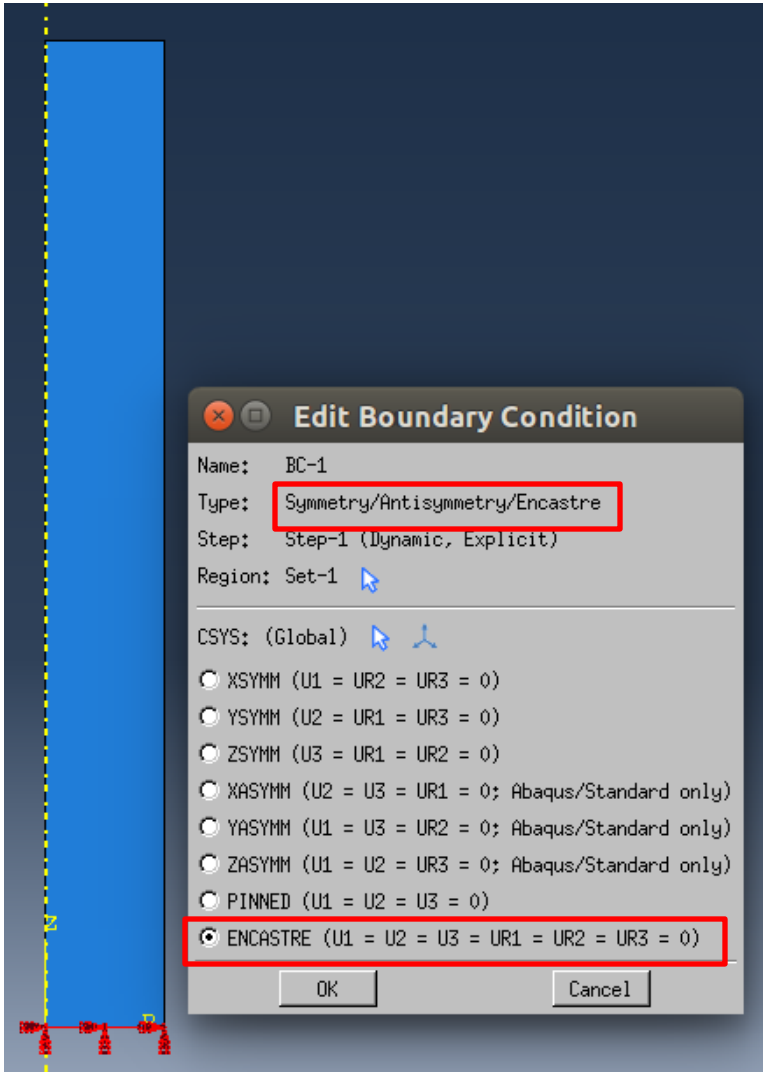


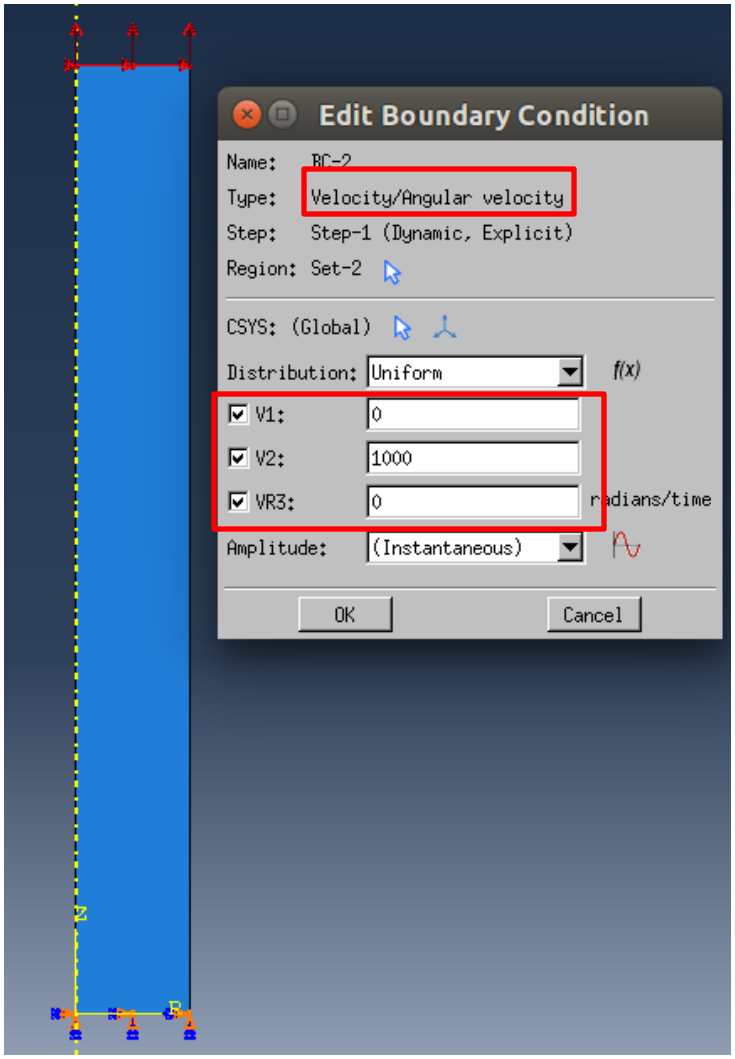
Cliquer sur « Create Boundary Condition »





→Définir les conditions aux limites et les conditions initiales comme suit:

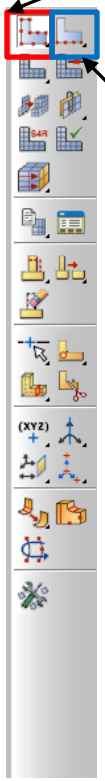


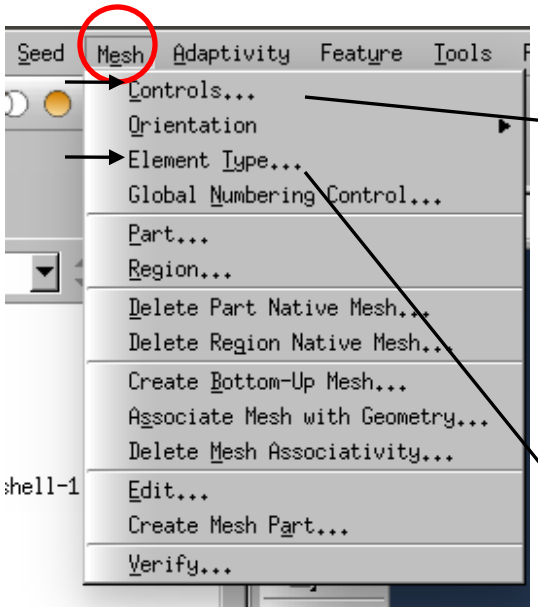


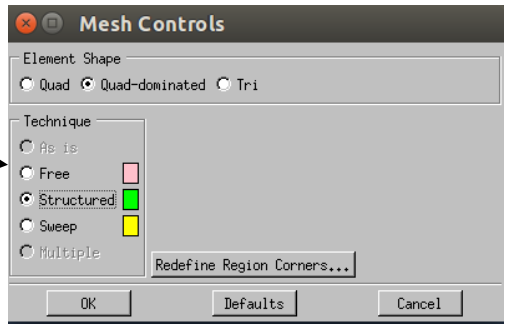
Maillage de l'éprouvette

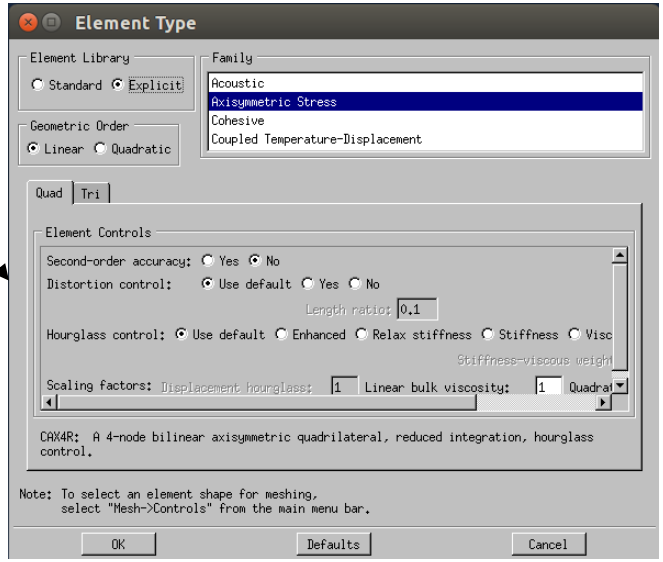
Mailler uniformément l'éprouvette

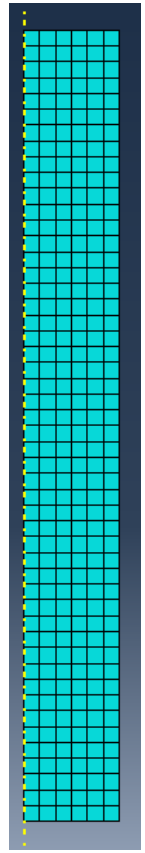
Mailler différemment chaque arête de l'éprouvette

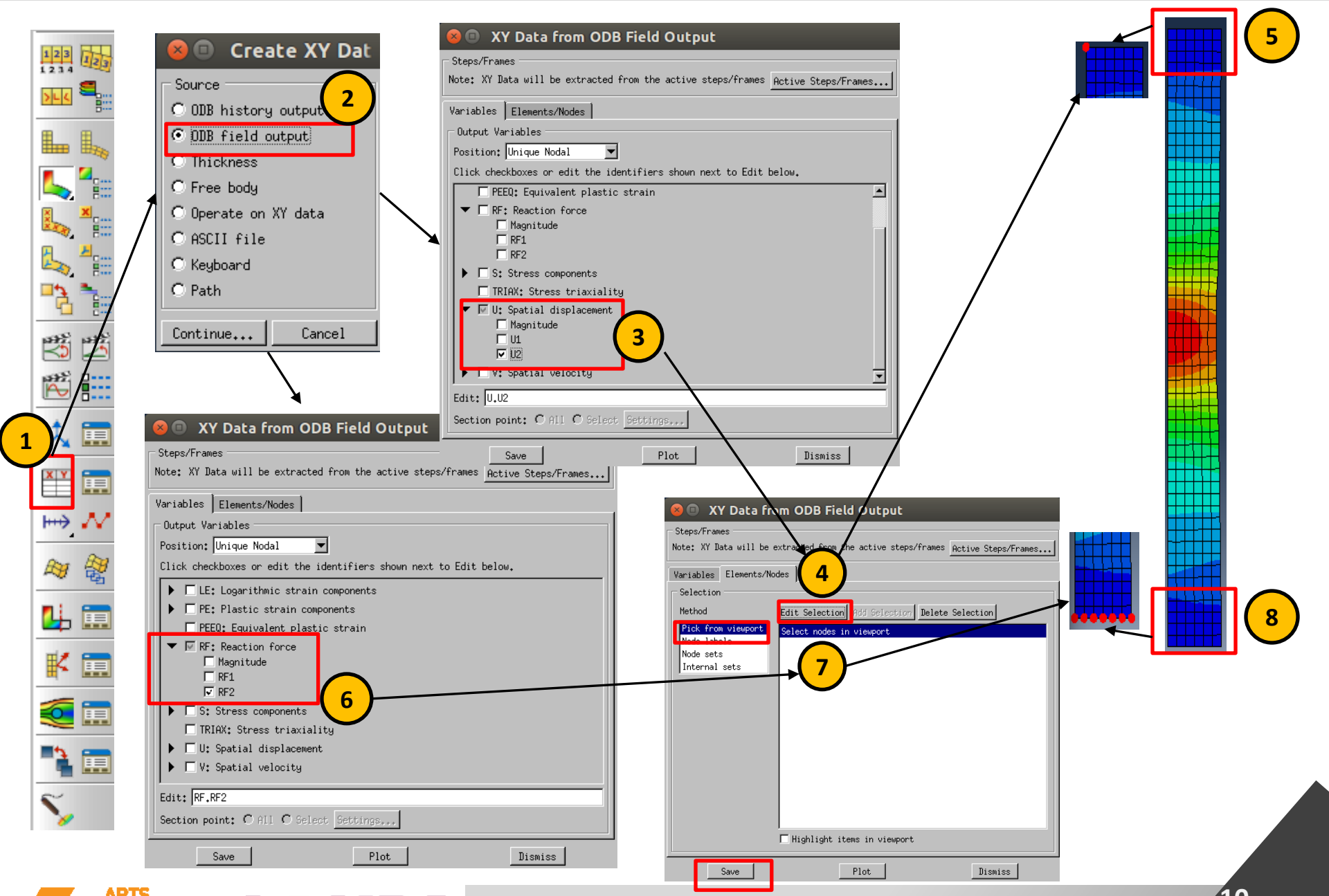


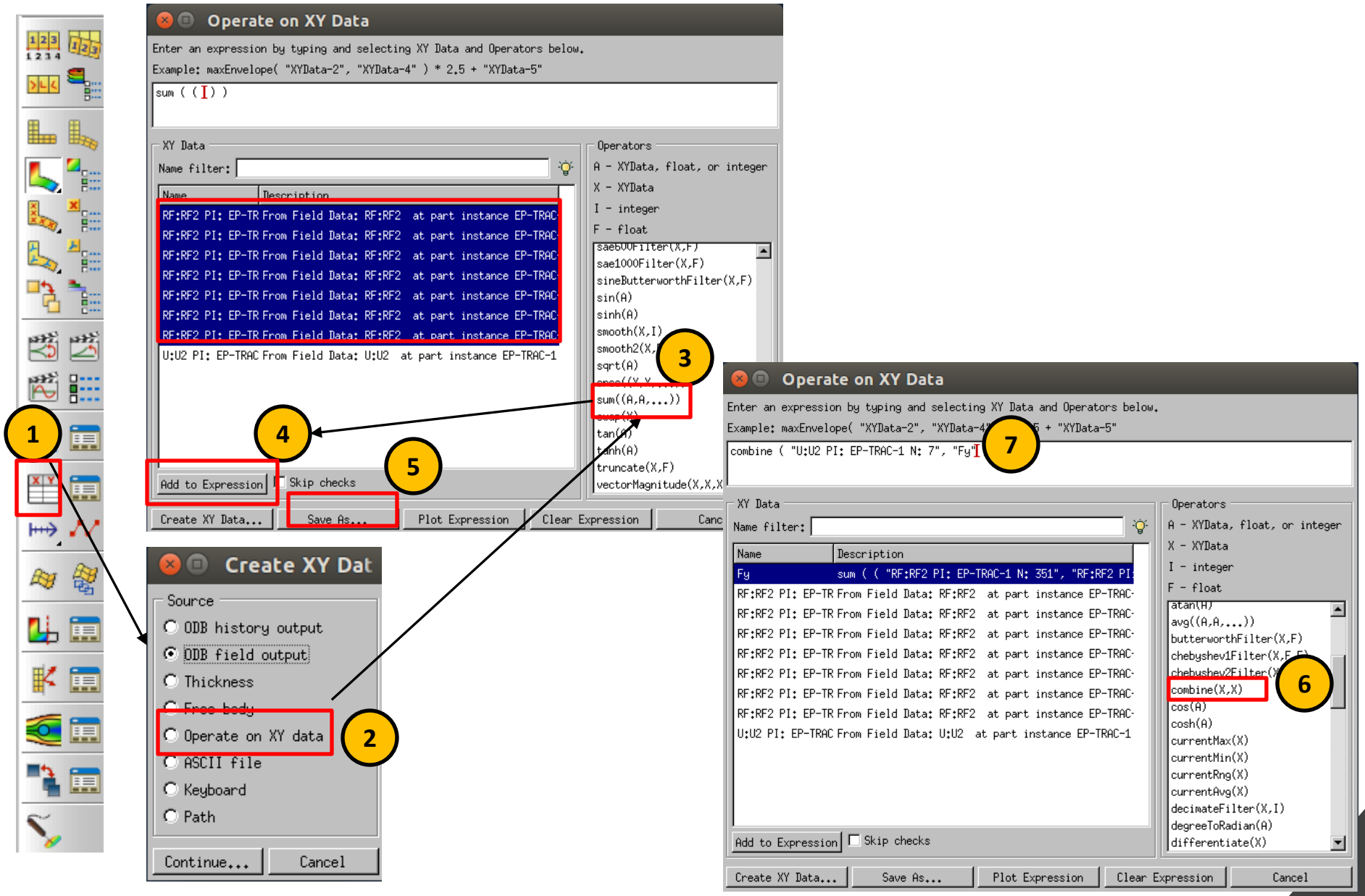




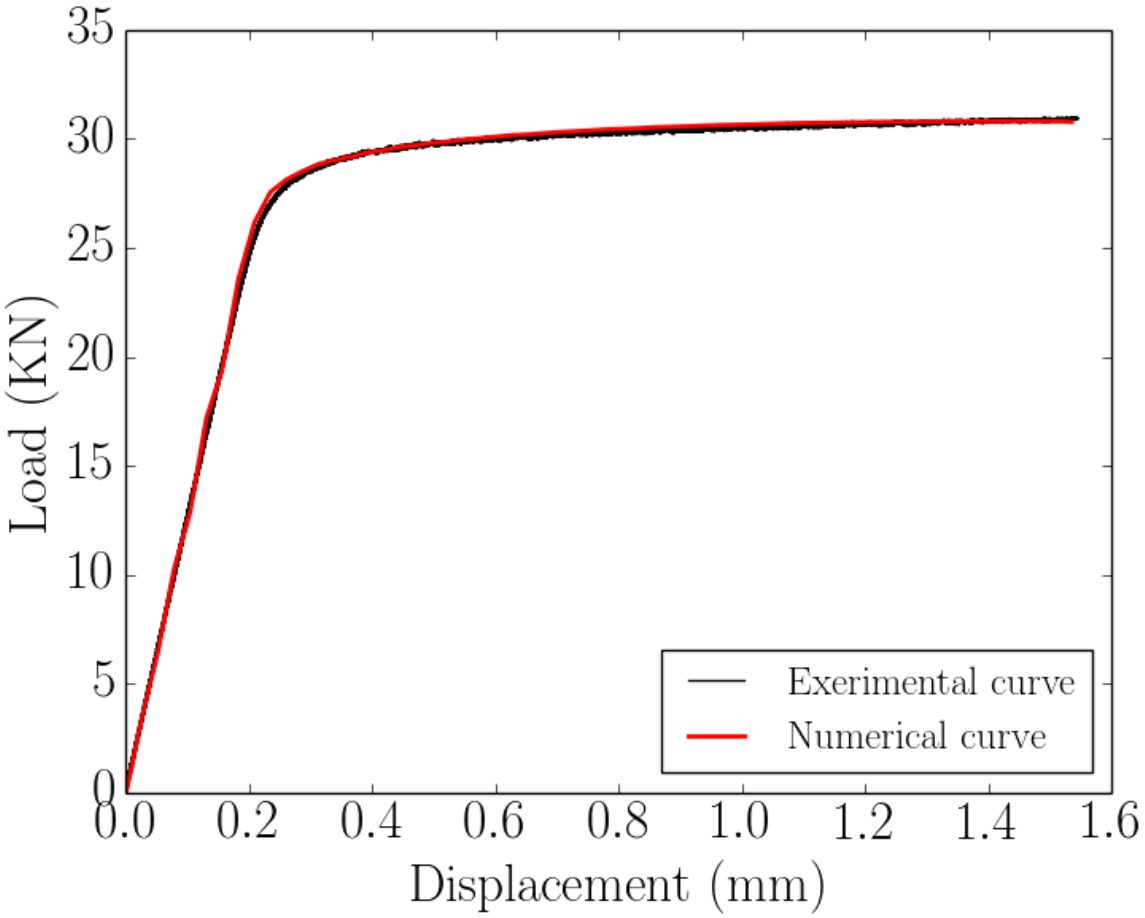





Create XY Dat
Source
ODB history output
ODB field output
Thickness
Free body
Operate on XY data
ASCII file
Keyboard
Path
Continue...
Cancel
2
XY Data from ODB Field Output
Steps/Frames
Note: XY Data will be extracted from the active steps/frames
Active Steps/Frames...
Variables
Elements/Nodes
Output Variables
Position: Unique Nodal
Click checkboxes or edit the identifiers shown next to Edit below.
PEEQ: Equivalent plastic strain
RF: Reaction force
Magnitude
RF1
RF2
S: Stress components
TRIAX: Stress triaxiality
U: Spatial displacement
Magnitude
U1
U2
V: Spatial velocity
Edit: U.U2
Section point: All Select Settings...
3
Save
Plot
Dismiss
1
LE: Logarithmic strain components
PE: Plastic strain components
PEEQ: Equivalent plastic strain
RF: Reaction force
Magnitude
RF1
RF2
S: Stress components
TRIAX: Stress triaxiality
U: Spatial displacement
V: Spatial velocity
Edit: RF.RF2
6
4
Selection
Method
Pick from viewport
Node sets
Internal sets
Edit Selection
Add Selection
Delete Selection
Select nodes in viewport
7
Highlight items in viewport
5
8

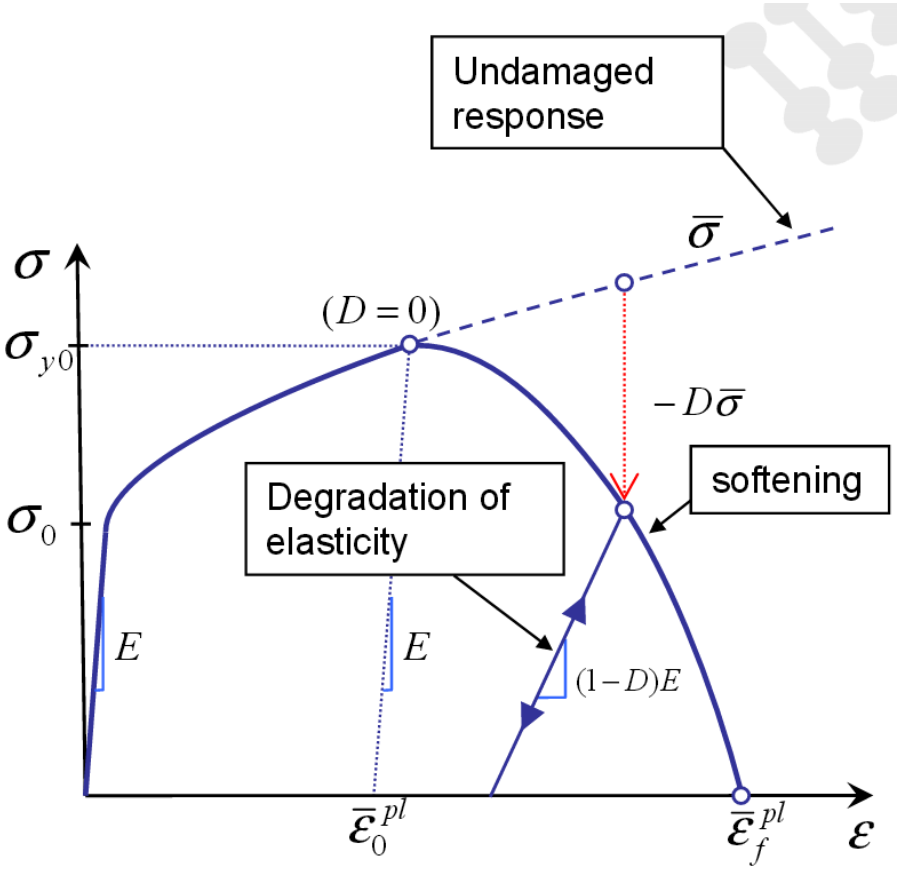

Operate on XY Data
Enter an expression by typing and selecting XY Data and Operators below.
Example: maxEnvelope("XYData-2", "XYData-4") * 2.5 + "XYData-5"
sum (( ))
XY Data
Name filter:
Name
Description
RF:RF2 PI: EP-TR From Field Data: RF:RF2 at part instance EP-TRAC
U:U2 PI: EP-TRAC From Field Data: U:U2 at part instance EP-TRAC-1
Operators
A - XYData, float, or integer
X - XYData
I - integer
F - float
sae600Filter(X,F)
sae1000Filter(X,F)
sineButterworthFilter(X,F)
sin(A)
sinh(A)
smooth(X,I)
smooth2(X,
sqrt(A)
sum((A,A,...))
tan(A)
tanh(A)
truncate(X,F)
vectorMagnitude(X,X,X
Add to Expression
Skip checks
Create XY Data...
Save As...
Plot Expression
Clear Expression
Canc
1
2
3
4
5
Create XY Dat
Source
ODB history output
ODB field output
Thickness
Free body
Operate on XY data
ASCII file
Keyboard
Path
Continue...
Cancel
Operate on XY Data
Enter an expression by typing and selecting XY Data and Operators below.
Example: maxEnvelope("XYData-2", "XYData-4
+ "XYData-5"
combine ("U:U2 PI: EP-TRAC-1 N: 7", "Fy"
7
XY Data
Name filter:
Name
Description
Fy
sum (("RF:RF2 PI: EP-TRAC-1 N: 351", "RF:RF2 PI:
RF:RF2 PI: EP-TRAC From Field Data: RF:RF2 at part instance EP-TRAC-
U:U2 PI: EP-TRAC From Field Data: U:U2 at part instance EP-TRAC-1
Operators
A - XYData, float, or integer
X - XYData
I - integer
F - float
atan(A)
avg((A,A,...))
butterworthFilter(X,F)
chebyshev1Filter(X,F,F)
chebyshev2Filter(X
combine(X,X)
cos(A)
cosh(A)
currentMax(X)
currentMin(X)
currentRng(X)
currentAvg(X)
decimateFilter(X,I)
degreeToRadian(A)
differentiate(X)
6
Add to Expression
Skip checks
Create XY Data...
Save As...
Plot Expression
Clear Expression
Cancel

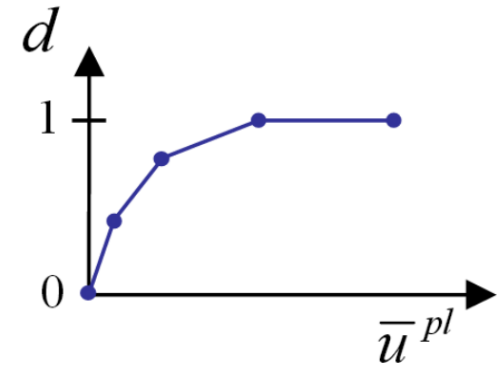
Validation de la simulation numérique

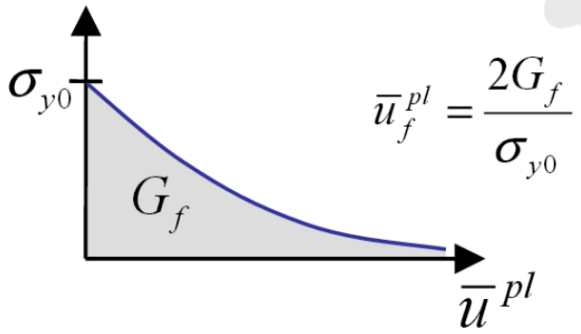


Loi d'endommagement de Johnson-Cook

$$\bar{\varepsilon}_f^{pl} = \left[D_1 + D_2 \exp D_3\left(\frac{p}{\sigma}\right)\right]\left[1 + D_4 ln\left(\frac{\dot{\varepsilon}^{pl}}{\dot{\varepsilon}_0}\right)\right]\left[1 + D_5 \frac{\theta - \theta_{room}}{\theta_{melt} - \theta_{room}}\right]$$







Source : documentation ABAQUS