Utilisation du module Part

1/ DESSIN COMPORTANT DES MODELISATIONS DIFFERENTES

1,1/ PRINCIPE DE CRÉATION D'UNE PART

Supposons que l'on souhaite créer la pièce suivante pour laquelle il a été décidé de mailler la partie A en volume, la partie B en plaque et la partie C en poutre.



Création d'une part

1,1,A / Il faut d'abord créer un part volumique ici nommée exemple1 1) Choisir le module part Module Part Model: Model-1 Y Pa 3) donner le nom 2)_ Create Part 4) Choisir ces options puisque dans ce cas on désire réaliser 6.6 Name: EXEMPLE 1 une pièce volumique déformable par extrusion Modeling Space 🛛 祠 ⊙ 3 CZD Planar ○ Axisymmetric 0. Туре Options 1, 1-1, • Deformable Ľ 🔿 Discrete rigid None available 🔿 Analytical rigid 13 -Geo. Base Feature Shape Туре (XYZ) \$ 💿 s.ka Extrusion 21. × Revolution Shell 5меер O Wire ₩ [+[O Point 5) cliquer sur continue -Approximate size: 200 Continue Cancel

Dessiner la partie volumique 3D



Dessiner la partie plaque 2D

1,1,C / Ajouter une feature surface pour dessiner la partie B



1,1,D / Dessiner le trait vertical et faire l'extrusion



1,1,E / Ajouter une troisième feature pour représenter la partie C





Illustration de l'encastrement.

Le plus bel exemple d'encastrement est donné par les racines d'un arbre. Lorsque celui-ci est renversé, c'est souvent le sol qui n'a pas résisté (glissement de terrain).



L'étape 1 : Part (pour créer la géométrie)

Création d'une nouvelle pièce (part) en deux dimensions (2D) :



Sélectionner l'outil **rectangle** et tracer un rectangle avec les **dimensions** 60x10mm et valider par **Done**.

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Une fois la pièce créé, on rentre les propriétés du matériau :

L'étape 2 : Proprety (pour donner les caractéristiques du matériau)

a- donner les caractéristiques du matériau

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A ce stade, on clique sur édite Material == Mecanical == Elasticity == Elastic :

On saisit les valeurs de (module de young et le coefficient de poisson) : (2e7 et 0.3) et valider par OK.

Si vous voulez jeter un coup d'œil sur les valeurs (vérification), cliquez sur l'icône Material Manager

Edit Material
Name: Material-1
Description: Edit
Material Behaviors
Elastic
<u>G</u> eneral <u>M</u> echanical <u>T</u> hermal <u>O</u> ther Delete
Elastic
Type: Isotropic Suboptions
Use temperature-dependent data
Number of field variables:
Moduli time scale (for viscoelasticity): Long-term
No compression
No tension Data
Vouna's Poisson's
Modulus Ratio
1 2e/ 0.3
OK

b- Create section et en valider par continue ...

Create Section							
Name: Secti	Name: Section-1						
Category	Туре						
Solid	Homogeneous						
Shell	Generalized plane strain Eulerian						
🔘 Beam							
Fluid	Composite						
Other							
Continu	e Cancel						

On coche plane stress/strain, on saisit la valeur 2 et on valide par OK

Edit Section	×
Name: Section-1 Type: Solid, Homogeneous	
Material: Material-1	▼ Create
Plane stress/strain thickness	s: 2
ОК	Cancel

Selectionner region to be assing, cliquer sur la géometrie de la piece et valider par Done.



📧 Edit Se	ction Assignme	nt	x
Region			
Region:	(Picked)		
Section			
Section:	Section-1	•	Create
Note: L a	ist contains only pplicable to the	sections selected regi	ons.
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Thickne	ss		
Assignm	ent: 💿 From s	ection 🔘 Fro	om geometry
	ОК	Ca	ancel

Une fenêtre apparait et valider par OK



L'étape 3 : Assembly (Allez vers la commande Assembly)



Cliquer sur Creat instance

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mesh, you must edit its part's mesh.		
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valider par OK.

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L'étape 4 : Step (Allez vers la commande step)

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Cliquer sur la commande creat step : Lisser les paramètres telle qu'il est et Cliquer sur continue...

Create Step					
Name: Step-1					
Insert new step after					
Initial					
Procedure type: General					
Dynamic, Explicit					
Dynamic, Temp-disp, Explicit					
Geostatic					
Heat transfer					
Soils					
Static General					
Static, Riks +					
Continue Cancel					

Et puis cliquer sur OK.

Edit Step
Name: Step-1
Type: Static, General
Basic Incrementation Other
Description:
Time period: 1
Nlgeom: Off (This setting controls the inclusion of nonlinear effects On of large displacements and affects subsequent steps.)
Automatic stabilization: None
Include adiabatic heating effects
OK Cancel

L'étape 5: Load (Cliquer sur la commande Load pour entrer les conditions aux limites)

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Cliquer sur la commande encastrement pour fixer la piece

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Cliquer sur continue ...



Sélectionner l'arrête de la pièce on met l'encastrement et valider par Done.



Sélectionner (Encatrer) et valider par OK.



Correspondance des axes (X=1, Y=2 et Z=3)

- U : déplacement
- R : rotation
- S : Stress (contrainte)
- U: Strain (Déplacement)
- E : Young Modulus (module de Young)



Apres validation on obtient le résultat suivant :

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Cliquer sur creat load pour entrer la force à exercer



On applique une force de -1000N dans le coin supérieur droite de la pièce et on valider par Done.



Edit Load	X
Name: Loa	d-1
Type: Con	centrated force
Step: Step	o-1 (Static, General)
Region: (Pic	ked)
CSYS: (Glo	bbal) Edit 🙏 Create
Distribution:	Uniform Create
CF1:	0
CF2:	-1000
Amplitude:	(Ramp) Create
🔲 Follow no	dal rotation
Note: Force	will be applied per node.
0	Cancel

L'étape 6 : Mesh (pour créer le maillage.)

Aller vers la commande Mesh pour créer le maillage.

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Sélectionner **part** pour activer la géométrie de la pièce.



Cliquer sur seed part (global seeds) et saisir la valeur de 6 puis Apply et OK.

Global Seeds
Sizing Controls
Approximate global size: 6
Curvature control
Maximum deviation factor (0.0 < h/L < 1.0): 0.1
(Approximate number of elements per circle: 8)
Minimum size factor (as a fraction of global size): Use default (0.1) Specify (0.0 < min < 1.0)
OK Apply Defaults Cancel

Sélectionner sur l'icône Maillage (Mesh part) et cliquer sur la géométrie de la pièce, valider par Yes pour avoir la piece mailler.



L'étape 6 Job Aller vers Job pour voir les résultats du calcul.

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Cliquer sur l'icône creat Job et sur le bouton continue ...



Il apparait une boite de dialogue Edit Job, valider par OK

💶 Edit Job				-		×
Name: Job-1						
Model: Mode	I-1					
Analysis produ	ict: Abaqu	s/Standard				
Description:						
Submission	General	Memory	Parallelization	Precision		
- Job Type -						
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Ensuite cliquer sur **Job Manger** et cliquer **Submit**, après un moment de calcul, il apparait sur le status que l'opération est terminé, pour voir les résultats on clique sur **Results**.

💽 Job Manag	jer			×
Name	Model	Туре	Status	Write Input
Job-1	Model-1	Full Analysis	None	Data Check
				Submit
				Continue
				Monitor
				Results
				Kill
Create	Edit Copy	Rename	Delete	Dismiss

Il faut attendre un peu, juste le temps de calcul, ensuite il apparait le resultat suivant :

lame	Model	Туре	Status	Write Inp
ob-1	Model-1	Full Analysis	Completed	Data Che
				Submit
				Continu
				Monitor
				Results
				Kill

Ensuite on peut voir la simulation de la déformation



On clique sur **Tools == Query == Noueds**. Sur la pièce on clique sur le point supérieur droite et on bas on voit les résultats qui s'affiche.



On refait la meme chose pour le déplacement.