Code_Aster

Titre : Modélisation COQUE_AXIS
Responsable : KUDAWOO Ayaovi-Dzifa

Version default

Date : 29/03/2016 Page : 1/4
Clé : U3.12.02   Révision   :
5e0b52e2c624

Modelings COQUE_AXIS

Summary:

This document describes for modeling COQUE_AXIS :

- degrees of freedom carried by the finite elements which support modeling,
- the related meshs supports,
- supported loadings,
- nonlinear possibilities,
- CAS-tests implementing modelings.

modeling thermoelastoplastic COQUE_AXIS corresponds to a formulation resulting from the models 3D with a kinematics of hull [R3.07.02].

They is usable to model structures on average surface of particular geometry:

- hulls with symmetry of revolution around the axis OY,

Thermomechanical calculations are chained starting from the finite elements of thermal hulls (see [U3.22.01]).

Code_Aster

Version default

Titre : Modélisation COQUE_AXIS
Responsable : KUDAWOO Ayaovi-Dzifa

Date : 29/03/2016 Page : 2/4
Clé : U3.12.02   Révision   :
5e0b52e2c624

1   Discretization

1.1   Degrees of freedom

For three modelings of hull the degrees of freedom of discretization are, in each node of the mesh support, the three components of displacement (two translations and a rotation). The nodes are supposed to belong to the average surface of the hull.

Finite element	Degrees of freedom (with each node top)		
MECXSE3	DX	DY	DRZ

1.2   Mesh support of the matrices of rigidity

The meshs support of the finite elements, in displacement formulation, are segments with three nodes:

Modeling	Mesh	Finite element	Remarks
COQUE_AXIS	SEG3	MECXSE3	

1.3   Mesh support of the loadings

All the applicable loadings on the average surface of the elements of hull are treated by direct discretization on the mesh support of the element in displacement formulation.

No mesh support of loading is thus necessary for the faces of the elements of hulls.

For imposed displacements the meshs support are meshs reduced to a point.

2   Assignment of the characteristics

For these elements of structures 2D, it is necessary to affect geometrical characteristics which are complementary to the data of grid. The definition of these data is carried out with the order AFFE_CARA_ELEM associated with the keyword following factor:

- **HULL**

  Allows to define and affect on the meshs, the thickness, the coefficient of shearing, offsetting,…

Code_Aster

Titre : Modélisation COQUE_AXIS
Responsable : KUDAWOO Ayaovi-Dzifa

Version default

Date : 29/03/2016 Page : 3/4
Clé : U3.12.02   Révision   :
*   5e0b52e2c624*

3   Supported loadings

The loadings available are the following:

- **`FORCE_COQUE`**

  Allows to apply surface efforts.

- **`PRES_REP`**

  Allows to apply a pressure to a field of continuous medium.

- **`ROTATION`**

  Allows to define the number of revolutions and the vector of rotation.

- **`GRAVITY`**

  Allows to apply a loading of type gravity.

- The application of a thermal loading of dilation is carried out by defining the keyword factor AFFE_VARC under AFFE_MATERIAU [U4.43.03].

4   Non-linear possibilities

4.1   Law of behaviors

Laws of behaviors specific to these modelings, usable under BEHAVIOR in STAT_NON_LINE and DYNA_NON_LINE are the relations of behavior in plane constraints available with modeling 'AXIS' (*cf.* [U4.51.11]).

4.2   Deformations

Only linearized deformations keyword 'SMALL' under DEFORMATION are available in the relations of behavior (*cf.* [U4.51.11]).

Code_Aster

Titre : Modélisation COQUE_AXIS
Responsable : KUDAWOO Ayaovi-Dzifa

Version
default

Date : 29/03/2016 Page : 4/4
Clé : U3.12.02   Révision   :
5e0b52e2c624

5   Examples of implementation: CAS-tests

- **COQUE_AXIS**
  - Linear statics
    SSLS114I [V3.03.114]: Quasi-static analysis of a cylindrical quarter of binding ring subjected to a pressure.