

## PROPOSITION DE STAGE EN COURS D'ETUDES

Référence : **DAAA-2022-035**

(à rappeler dans toute correspondance)

Lieu : Châtillon

Département/Dir./Serv. : DAAA/DEFI

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Responsable(s) du stage : Sâm Landier

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### DESCRIPTION DU STAGE

Thématique(s) : Meshing; Numerical Geometry; CFD; Turbomachinery

Type de stage : ☒ Fin d'études bac+5 ☐ Master 2 ☐ Bac+2 à bac+4 ☐ Autres

#### Intitulé : Adapting and intersecting meshes for turbomachinery CFD simulations

Sujet : ONERA has developed for several years a meshing strategy based on intersecting and assembling meshes in a conformal way. This approach is suitable for turbomachinery simulations that require strict conservativity.

The assembly strategy is made of three major steps : first, preparing the components to join by adapting them in the overlap region, then computing the intersections, and finally regularizing the resulting mesh.

Because of the symmetry of these configurations, computations are commonly done by setting periodic boundary conditions on a single canal surrounding some blades over the machine stages. It is therefore crucial that the three steps of the meshing strategy preserve the mesh periodicity.

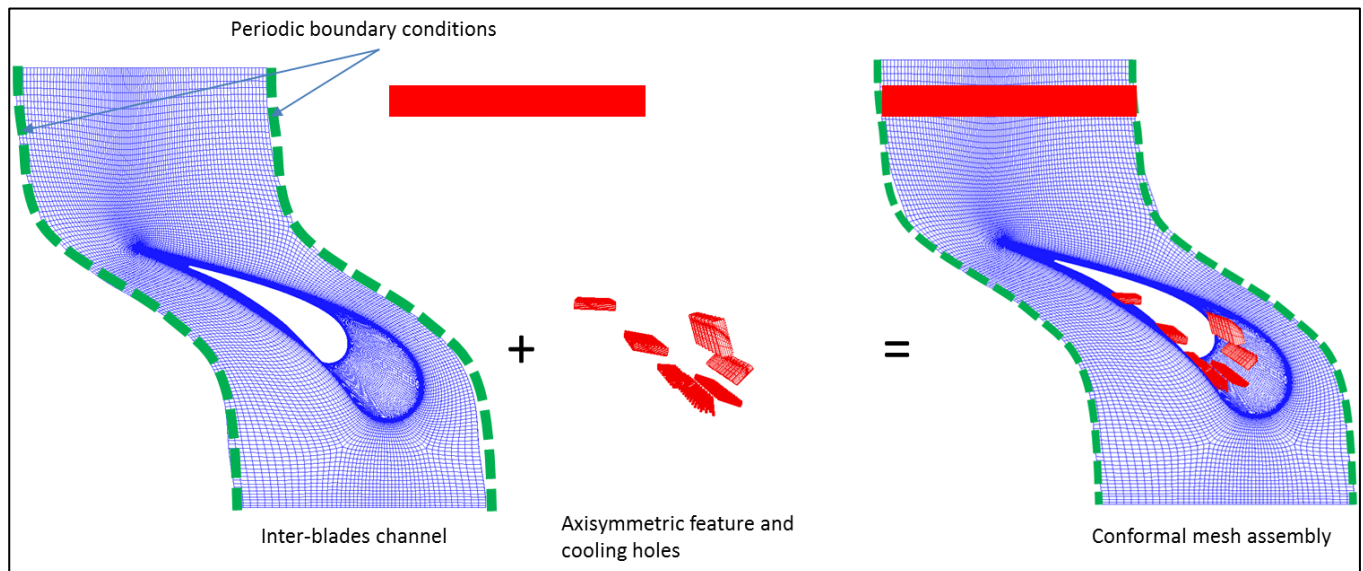


Fig. 1 : assembling features to a inter-blades channel by intersections.

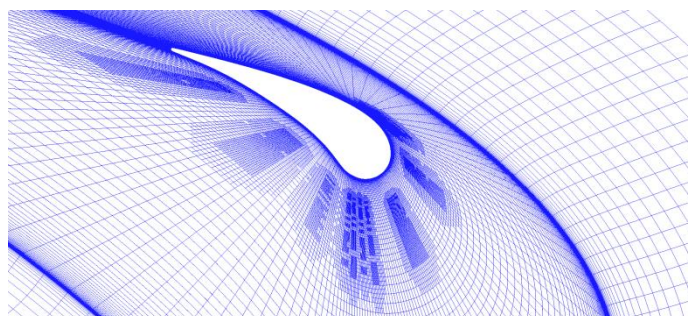


Fig. 2 : channel adapted to the holes before assembling.

This internship proposes to :

1. improve the existing algorithms and specify new ones to ensure the periodicity conditions for each stage of the meshing strategy
2. apply these features and demonstrate their benefit by running CFD simulations with elsA solver on some well referenced turbomachinery cases.

Est-il possible d'envisager un travail en binôme ? **Oui**

**Méthodes à mettre en oeuvre :**

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Recherche théorique | <input checked="" type="checkbox"/> Travail de synthèse             |
| <input checked="" type="checkbox"/> Recherche appliquée | <input checked="" type="checkbox"/> Travail de documentation        |
| <input type="checkbox"/> Recherche expérimentale        | <input checked="" type="checkbox"/> Participation à une réalisation |

Possibilité de prolongation en thèse : **A renseigner**

**Durée du stage :** Minimum : 4 mois Maximum : 6 mois

Période souhaitée : Février-Juillet 2022

**PROFIL DU STAGIAIRE**

Connaissances et niveau requis : Numerical analysis, applied mathematics, programming. C++ skills are necessary.	Ecoles ou établissements souhaités : Engineering school or Master 2 in numerical analysis, applied mathematics or IT.
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