Research Grants for PhD students from the China Scholarship Council

Information Form (please read the guidelines carefully on the website www-csc.utt.fr)

Supervisor's name : BOROUCHAKI Given names : Houman

Status (prof., assistant prof., …) : Professor

Laboratory : GAMMA3 Website address : https://recherche.utt.fr/automatic-mesh-generation-adv

Institution : University of Technology of Troyes Website address : https://www.utt.fr/

Scientific competence of the supervisor:

Dr. Houman Borouchaki is a professor in applied mathematics and mechanics at the University of Technology of Troyes (UTT-FRANCE) a French engineering school since 1998. He is the head of GAMMA3 (Automatic Mesh Generation and Advanced Methods) Unit Research. His research activities include scientific computing, numerical analysis, finite element computation, computed aided design, mesh generation, adaptive meshing, a posteriori error estimation, tridimensional reconstruction, metal forming processes, composites science and technology and numerical simulations. His current works focus on the development of novel algorithms and applications for adaptive anisotropic

Two major publications in the field proposed for the PhD :

1. Reference books : H. Borouchaki and P.L. George, "Meshing, Geometric Modeling and Numerical Simulation", Volumes 1 & 2, Wiley 2017 and 2019.
2.

Website address of the personal page : https://recherche.utt.fr/research-directory/houman-borouchaki

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Description of the research work proposed for a PhD ***Topic # (see list) :*** 8

Title : Geometric Modeling

Subject :

Generating meshes of surfaces composed of parametric patches, usually produced by CAD (computer aided design) environments,
can be done directly in the tridimensional space or indirectly via the parametric spaces.
Following the latter approach, the difficulty is to take into account the ``geometric deformation''
due to the surface parameterization.
Thanks to anisotropic mesh generation methods in two dimensions,
the latter indirect technique can generally be successfully applied without much difficulty.
For evaluating this deformation metric, it is necessary to know,
in addition to the parameterization of the patch, the first derivatives of this parameterization.
The evaluations of these derivatives are often costly while generating meshes of these surfaces.
Besides, in the presence of degenerate patches, these derivatives are not well defined.
To remedy this, a simple solution consists in approximating each surface patch by a geometric support
having a simpler and more regular parameterization, in particular a triangulation faithfully representing the surface

Keywords :

Geometric Modeling, Meshing and remeshing, Surface meshing, Advanced computation, Adaptive computation.

Expected collaborations :

Background required from the applicant :

Geometric modeling, meshing and remeshing

Existence of a PDF file detailing the proposal ("yes" or "no") : No

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