Università degli Studi di Pavia
Computational Mechanics & Advanced Materials Group - DICAr

fondazione cariplo

Regione Lombardia

# Isogeometric Analysis Suitable Trivariate Models from Cuboid Decomposition Quadrangulation

SEMINAR

We present an effective method to automatically construct trivariate B-spline models of complicated geometry and arbitrary topology. Our method takes as input a solid model defined by its triangulated boundary. Using cuboid decomposition, an initial polycube approximating the input boundary mesh is built. This polycube serves as the parametric domain of the tensor-product spline representation required for isogeometric analysis. The polycube's nodes and arcs decompose the input model locally into quadrangular patches, and globally into hexahedral domains. Using aligned global parameterization, the nodes are re-positioned and the arcs are re-routed across the surface in a way to achieve low overall patch distortion, and alignment to principal curvature directions and sharp features. Based on the optimized polycube and parameterization, compatible B-spline boundary surfaces are reconstructed. Finally, the interior volumetric parameterization is computed using Coon's interpolation and the B-spline surfaces as boundary conditions. The efficiency and the robustness of the proposed approach are illustrated by several examples.

**Prof. Thomas Elguedj**
Mechanical Engineering Department
INSA Lyon

***May 30th, 2:30pm***
***DICAr MS1 Meeting Room***
Via Ferrata, 3 – Pavia