

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



## IGA on polar domains with corners: graded meshes, collocation points and application to crack identification

In isogeometric analysis, classical two-dimensional model domains with corners, such as circular sectors or L-shaped domains, can be conveniently represented with a single patch by collapsing one edge of the parametric square into the conical point. In this seminar, a graded mesh refinement strategy that ensures optimal convergence for suitably chosen grading parameters is presented to address the corner singularity of the PDE solution.

Unlike other local refinement methods in IGA, the approach maintains the tensor-product structure of splines as the meshes are graded toward the polar point. Corresponding projection error estimates are established and validated through numerical experiments. Furthermore, building on the Galerkin framework, a graded collocation scheme is introduced and supporting numerical results are showcased. Finally, a data-based application of the method for the identification of cracks in membranes is illustrated.



Figure: Solving the Poisson equation on the Pacman domain using graded meshes

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