

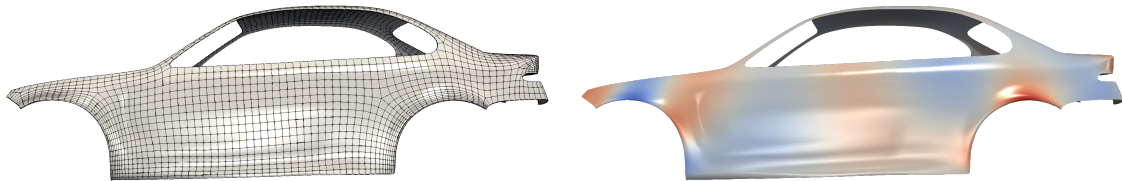
## Smooth splines on unstructured meshes

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Isogeometric Analysis [1] generalizes classical finite element analysis and, at the same time, intends to seamlessly unify it with the field of Computer-Aided Design. Achieving this latter objective would encapsulate the entire engineering design-through-analysis workflow in a uniform framework, yielding a significant boost to the efficiency of current engineering workflows. A central problem in achieving this objective is design and analysis of complex two and three dimensional geometries of arbitrary topologies. This requires moving beyond splines on structured quadrilateral and hexahedral meshes – globally structured meshes cannot be used to represent arbitrary geometries and parameterization singularities (i.e., extraordinary points, polar points and extraordinary edges) must be introduced. Thus, the design and analysis of complex geometries requires that we construct and study spaces of smooth splines on unstructured meshes. This talk will present an overview of recently proposed analysis-suitable spline constructions (e.g., [2, 3]) as well as their generalizations [4].



**Figure:** An unstructured spline representation of a car body (left) and its free vibration analysis (right).

## References

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