Chair for Computation in Engineering
Deparment of Civil, Geo and Environmental Engineering
Technical University of Munich

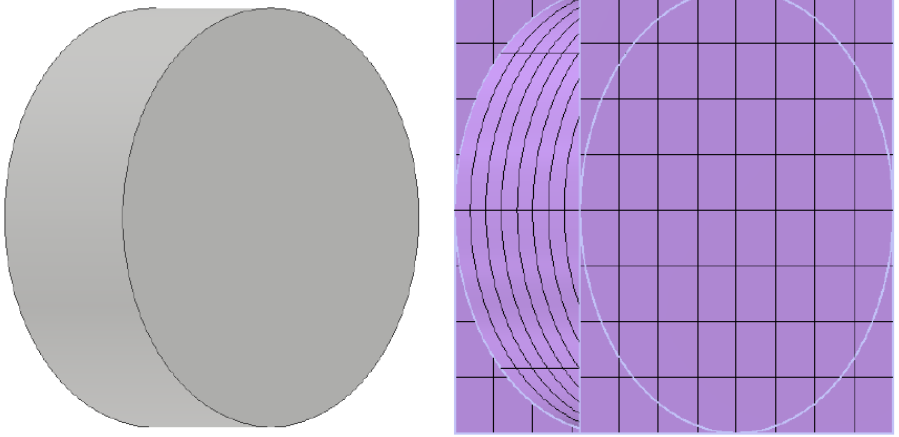
Trimmed Isogeometric Elements for an Acoustic Boundary Element Method

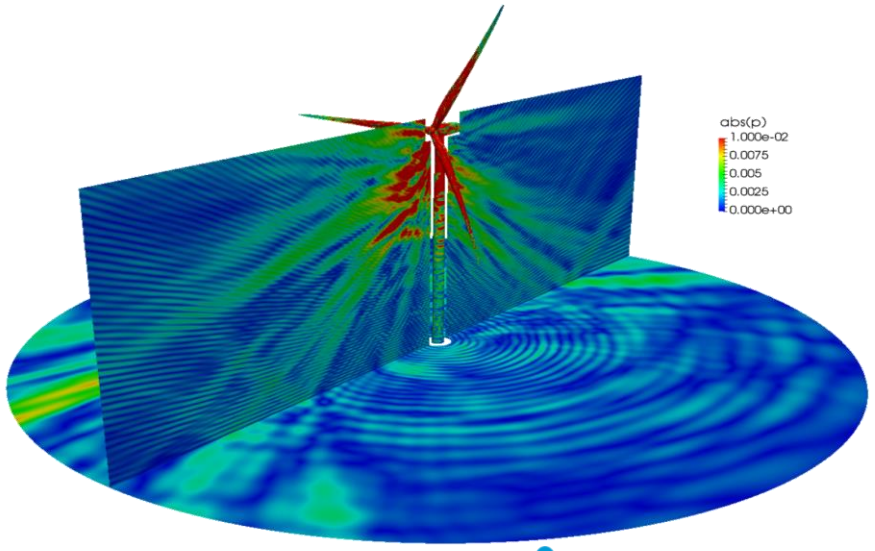
Project Characteristics

Modeling:	★★★★☆
Mathematics:	★★☆☆☆
Programming:	★★★★★
Science:	★★★★☆

Setting:

- Isogeometric Boundary Element Method computes the acoustics directly on the CAD geometry
- Common standard is the use of trimmed patches that are simple for the design, but more complex for the numerical integration
- A recent approach: use of Embedding Domain Methods [1] in the IGABEM [2]





Trimmed CAD and corresponding non-trimmed patches

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Novicos Noise and Vibration Concepts

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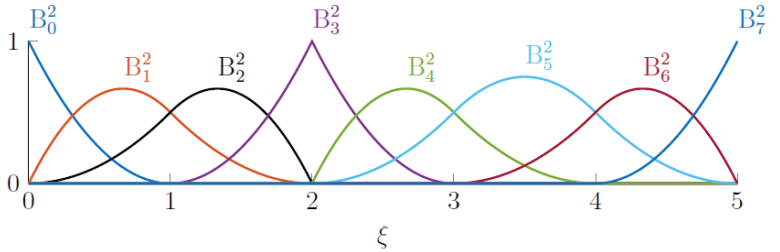
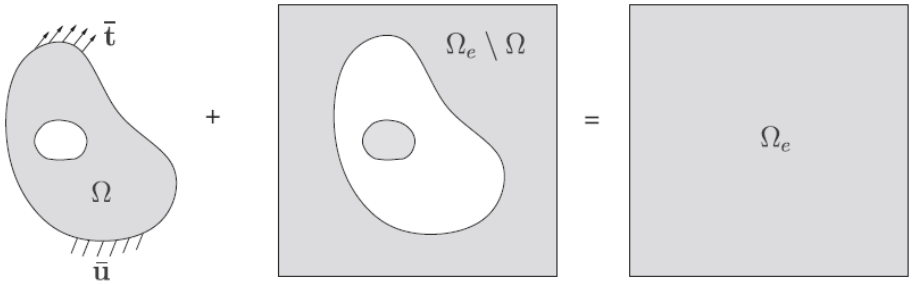
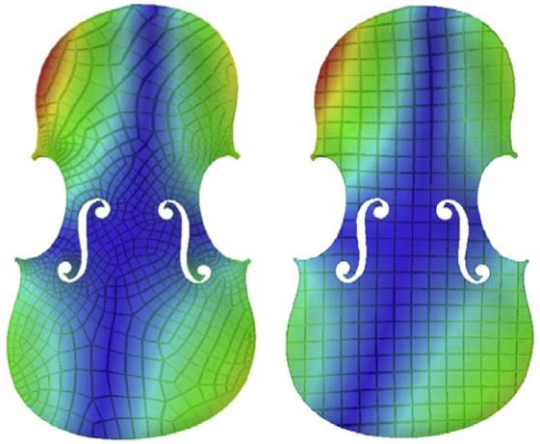
Your Tasks:

- Extend the mesh reader of the program to deal with trimmed CAD
- Adapt the numerical integration on trimmed surfaces, as described by [1], to the Isogeometric BEM [2]







References:

[1] E. Rank, S. Kollmannsberger, Ch. Sorger, A. Düster,. "Shell Finite Cell Method: A high order fictitious do-main approach for thin-walled structures." Computer Methods in Applied Mechanics and Engineering, Volume 200, Issues 45–46, 2011, 3200-3209.
[2] S. Keuchel, N. C. Hagelstein, O. Zaleski, O. von Estorff. "Evaluation of hypersingular and nearly singular integrals in the Isogeometric Boundary Element Method for acoustics." Computer Methods in Applied Me-chanics and Engineering, Volume 325, 2017, 488-504.