

# **Finite element methods for domain decomposition with non-matching meshes**

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Domain decomposition in finite element methods allows the use of independent meshes for different parts of the model. This facilitates the solution of large scale problems or problems with moving parts, and enables efficient computation through parallelization.

This talk outlines a method of domain decomposition for the Poisson problem related to Nitsche's approach to the approximation of Dirichlet boundary conditions. The method allows for non-overlapping, non-matching meshes discretizing the subdomains by introducing a hybrid variable on the interface to glue the subdomains together. It yields a positive definite global system, and stability is proven in the energy norm.

The function space for the hybrid variable can be chosen with great flexibility, which simplifies practical implementation considerably. As a basis for the interface space, B-Splines were chosen. B-Splines can be computed to any given order and smoothness with the De-Boor iteration, benefiting numerical integration. The locality of B-Splines (they are non-zero on a limited interval) minimizes coupling in the linear system.

Numerical tests were conducted to demonstrate the theoretical results.