

Seminario de Análisis Numérico y Modelamiento Matemático de Estudiantes

Nitsche's methods and applications to CFD

We discuss how slip conditions for the Stokes equation can be handled using Nitsche method, for a stabilized finite element discretization. Emphasis is made on the interplay between stabilization and Nitsche terms. Well-posedness of the discrete problem and optimal convergence rates, in natural norm for the velocity and the pressure, are established, and illustrated with various numerical experiments. The proposed method fits naturally in the context of a finite element implementation while being accurate, and allows an increased flexibility in the choice of the finite element pairs.

Bibliography

- [1] R. Araya, A. Caiazzo, and F. Chouly. Stokes problem with slip boundary conditions using stabilized finite elements combined with Nitsche. *Comput. Methods Appl. Mech. Engrg.* 427 (2024), pp. 117037.
- [2] R. Araya and F. Chouly. Residual a Posteriori Error Estimation for Frictional Contact with Nitsche Method. *Journal of Scientific Computing*, 96(3):87, 2023.
- [3] J. Nitsche, Über ein Variationsprinzip zur Lösung von Dirichlet-Problemen bei Verwendung von Teilräumen, die keinen Randbedingungen unterworfen sind, *Abh. Math. Sem. Univ. Hamburg*, 36 (1971), pp. 9–15.

Dr. Rodolfo Araya Durán
Universidad de Concepción

Departamento de Ingeniería Matemática, UdeC
Centro de Investigación en Ingeniería Matemática (CI²MA), UdeC
Centro de Modelamiento Matemático de la Universidad de Chile

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Auditorio Hermann Alder
Weller, CI²MA, UdeC