

# INCOMPRESSIBLE FLUID FLOW COMPUTATIONS BASED ON NURBS-ENRICHED FINITE ELEMENTS

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Motivated by the superior accuracy and better stability of NURBS-enriched Finite Elements, when applied to problems involving multi-body contact [1], we extend their applicability to fluid flow problems. Incompressible flow past stationary obstacles is analyzed in the framework of Finite Element (FE) Method. The concept of isogeometric analysis is applied using NURBS basis functions but only on the obstacle surface while the bulk fluid is modeled with Lagrange polynomials based finite elements. This is achieved by using elements that have a NURBS surface on the obstacle while all other basis functions are represented by Lagrange polynomials. The approach results in an enriched representation and analysis of the near surface region, where gradients are large, without significantly increasing the computational cost. This is demonstrated by the use of several numerical examples comparing the proposed approach with various existing FE based techniques.

## REFERENCES

- [1] C.J. Corbett and R.A. Sauer. NURBS-enriched contact finite elements. *under review*, 2013.