

NITSCHES METHOD FOR GENERAL BOUNDARY CONDITIONS

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ABSTRACT

We introduce a method for treating general boundary conditions in the finite element method generalizing an approach, due to Nitsche (1971), for approximating Dirichlet boundary conditions. We use Poisson's equations as a model problem and prove a priori and a posteriori error estimates. The method is also compared with traditional Galerkin method. The theoretical results are verified numerically.

REFERENCES

- [1] J.A. Nitsche "Über ein Variationsprinzip zur Lösung von Dirichlet-Problemen bei Verwendung von Teilräumen, die keinen Randbedingungen unterworfen sind". *Abhandlungen aus dem Mathematischen Seminar der Universität Hamburg*, Vol. **36**, 9–15, 1970/71.
- [2] M. Juntunen and R. Stenberg. "Nitsches Method for General Boundary Conditions". *Helsinki University of Technology. Institute of Mathematics. Research report A 530*, 2007. <http://math.tkk.fi/reports/a531.pdf>