NITSCHE MORTARING FOR PARABOLIC INITIAL-BOUNDARY VALUE PROBLEMS[*]

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Abstract. This paper is concerned with a method for the numerical solution of parabolic initial-boundary value problems in two-dimensional polygonal domains Ω with or without reentrant corners. The Nitsche finite element method (as a mortar method) is applied for the discretization in space, i.e., non-matching meshes are used. For the discretization in time, the backward Euler method is employed. The rate of convergence in some H^1-like norm and in the L_2-norm is proved for the semidiscrete as well as for the fully discrete problem. In order to improve the accuracy of the method in the presence of singularities arising in case of non-convex domains, meshes with local grading near the reentrant corner are employed for the Nitsche finite element method. Numerical results illustrate the approach and confirm the theoretically expected convergence rates.

Key words. parabolic problem, corner singularity, semidiscrete finite element method, non-matching meshes, Nitsche mortaring, fully discrete method

AMS subject classifications. 65M60, 65N30

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