Besov Regularity for Elliptic Boundary Value Problems in Polygonal Domains

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Abstract

This paper is concerned with the regularity of the solutions to specific elliptic boundary value problems in polygonal domains Ω contained in $I\!R^2$. Especially, we consider the specific scale $B^\alpha_\tau(L_\tau(\Omega))$, $1/\tau = \alpha/2 + 1/p$, of Besov spaces. The regularity of the variational solution in these Besov spaces determines the order of approximation that can be achieved by adaptive and nonlinear numerical schemes. The proofs are based on specific representations of the solutions which were, e.g., derived by Grisvard, and on characterizations of Besov spaces by wavelet expansions.

Key Words: Elliptic boundary value problems, adaptive methods, Besov spaces, nonlinear approximation, wavelets.

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