USING FINITE ELEMENT TOOLS IN PROVING SHIFT THEOREMS FOR ELLIPTIC BOUNDARY VALUE PROBLEMS

CONSTANTIN BACUTA, JAMES H. BRAMBLE, AND JOSEPH E. PASCIAK

Abstract. We consider the Laplace equation under mixed boundary conditions on a polygonal domain Ω. Regularity estimates in terms of Sobolev norms of fractional order for this type of problem are proved. The analysis is based on new interpolation results and multilevel representation of norms on the Sobolev spaces $H^\alpha(\Omega)$. The Fourier transform and the construction of extension operators to Sobolev spaces on $\mathbb{R}^2$ are avoided in the proofs of the interpolation theorems.

Dept. of Mathematics, Pennsylvania State University, University Park, PA 16802
E-mail address: bacuta@math.psu.edu

Dept. of Mathematics, Texas A & M University, College Station, TX 77843, USA.
E-mail address: bramble@math.tamu.edu

Dept. of Mathematics, Texas A & M University, College Station, TX 77843, USA.
E-mail address: pasciak@math.tamu.edu

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