

# SHIFT THEOREMS FOR THE BIHARMONIC DIRICHLET PROBLEM

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

ABSTRACT. We consider the biharmonic Dirichlet problem on a polygonal domain. Regularity estimates in terms of Sobolev norms of fractional order are proved. The analysis is based on new interpolation results which generalizes Kellogg's method for solving subspace interpolation problems. The Fourier transform and the construction of extension operators to Sobolev spaces on  $\mathbb{R}^2$  are used in the proof of the interpolation theorem.

DEPT. OF MATHEMATICS, THE 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

---

1991 *Mathematics Subject Classification.* 65F10, 65N30.

*Key words and phrases.* interpolation spaces, biharmonic operator, shift theorems.

This work was partially supported by the National Science Foundation under Grant DMS-9973328.