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Qingguang Guan, Max Gunzburger, Wenju Zhao

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Qingguang Guan

Center for Computation and Technology, Louisiana State University, Baton Rouge, LA 70803, USA

Max Gunzburger

Department of Scientific Computing, Florida State University, Tallahassee FL 32306-4120, USA

Wenju Zhao

Department of Mathematics, Southern University of Science and Technology, Shenzhen, Guangdong Province, Zip 518055, China

Abstract

A weak-Galerkin finite element method is used to determine approximate solutions of an elliptic variational inequality. Three sets of basis functions are employed: the first has constant values inside each element and on each edge; the second has constant values inside each element but is a linear polynomial on each edge; and the third has linear polynomials inside each element and on each edge. Error estimates, including convergence rates, are derived for all three cases. Numerical results were provided to illustrate the theoretical results, to show that the choice of how the obstacle function is approximated affects those rates, and to show the super-convergence for piecewise constant basis functions.

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Email addresses: qingguang@lsu.edu (Qingguang Guan), mgunzburger@fsu.edu (Max Gunzburger), zhaowj@sustc.edu.cn (Wenju Zhao)