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BOUNDARY ELEMENT COLLOCATION METHOD FOR SOLVING THE EXTERIOR NEUMANN PROBLEM FOR HELMHOLTZ'S EQUATION IN THREE DIMENSIONS*

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Abstract. We describe a boundary integral equation that solves the exterior Neumann problem for the Helmholtz equation in three dimensions. The unique solution is found by approximating a Fredholm integral equation of the second kind with the boundary element collocation method. We prove superconvergence at the collocation points, distinguishing the cases of even and odd interpolation. Numerical examples demonstrate the performance of the method solving the integral equation and confirm the superconvergence.

Key words. Fredholm integral equation of the second kind, Helmholtz's equation, exterior Neumann problem, boundary element collocation method, superconvergence

AMS subject classifications. 35J05, 45B05, 65N35, 65N38

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