

HARMONIC INTERPOLATING WAVELETS IN THE NEUMANN BOUNDARY VALUE PROBLEM IN A RING

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We consider the Neumann boundary value problem with continuous boundary values in a centrally symmetric ring with unit outer radius. The approach to solving the problem is based on expanding the continuous boundary values in interpolating and interpolating orthogonal 2π -periodic wavelets consisting of trigonometric polynomials. The idea for such an expansion and the scheme of interpolating and interpolating orthogonal 2π -periodic wavelets based on Meyer-type wavelets were proposed by Yu.N. Subbotin and N.I. Chernykh. It is convenient to use these series due to the fact that they are easily extended to polynomials harmonic in a circle, and the harmonic polynomials can be used to present the solution of the original problem in a ring as two series uniformly convergent in the closure of the ring. Moreover, the coefficients of the series are easily calculated and do not require the calculation of integrals. As a result, we obtain an exact representation for the solution of the Neumann boundary value problem in the ring in the form of two series in the mentioned system of harmonic wavelets and find an estimate for the error of approximating the exact solution by partial sums of the series.

Keywords: interpolating wavelets, harmonic functions, Neumann boundary value problem.

MSC: 35J25, 41A05

DOI: 10.21538/0134-4889-2020-26-4-279-289

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Received August 1, 2020

Revised October 16, 2020

Accepted October 23, 2020

Funding Agency: This study is a part of the research carried out at the Ural Mathematical Center.

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Cite this article as: D. A. Yamkovoï. Harmonic interpolating wavelets in the Neumann boundary value problem in a ring, *Trudy Instituta Matematiki i Mekhaniki UrO RAN*, 2020, vol. 26, no. 4, pp. 279–289.