

INTERNATIONAL BIWEEKLY ONLINE SEMINAR ON ANALYSIS, DIFFERENTIAL EQUATIONS AND MATHEMATICAL PHYSICS

Coordinators: Prof. Alexey Karapetyants, Prof. Vladislav Kravchenko

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On a defect numbers of the Dirichlet problem for a properly elliptic equation in the space of continuous functions

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We consider the Dirichlet problem for $2N$ -order properly elliptic equation with constant coefficients in the unit disc.

We seek the solution of the problem in the class of functions that are $2N$ -times continuously differentiable in the disc, and continuous up to the boundary along with derivatives of order no more than $N-1$. The necessary and sufficient conditions for solvability of this problem are obtained, and if these conditions hold, the solution is determined in an explicit form. The defect numbers (the number of the linearly independent solutions of the homogeneous problem and the number of the linearly independent conditions to the boundary functions, necessary and sufficient for the solvability of the in-homogeneous problem) determined by the coefficients of the equation. In the case, when the characteristic equation has two different roots, both of multiplicity N , represented another formula for the determination of the defect numbers. For special cases of the equations of fourth and sixth order the exact values of defect numbers are obtained. The connection of the problem under consideration with Chebyshev polynomials is shown.

References:

[1] Babayan A.H. On a Dirichlet Problem for Properly Elliptic Equation in the Space of Continuous Functions. Lobachevskii Journal of Mathematics. 2024; 45:12; 6011-6026.

[2] Babayan A.H. On a Dirichlet Problem for a Properly Elliptic Equation in the Space of Continuous Functions, in the Case of Multiple Roots. In the book: Analysis, PDE and Applications. Trends of Mathematics, 13. Springer Nature Switzerland AG 2025; pp. 75-82.

*Seminar website: <https://msrn.sfedu.ru/sl>. The seminar uses Microsoft Teams online platform.

Please send questions to ademp.seminar@gmail.com (Tatiana Andreeva, scientific secretary).

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