Green's function of a heat problem with a periodic boundary condition

Nurzhan E. ERZHANOV [1]

[1] *Institute of Mathematics and Mathematical Modeling, Kazakhstan,*
[1] *Regional Social and Innovative University, Kazakhstan*
E-mail: imanbaevnur@mail.ru

Abstract: In the paper a non-local initial-boundary value problem for a non-homogeneous one-dimensional heat equation is considered. The domain under consideration is a rectangle. The classical initial condition with respect to t is put. A non-local periodic boundary condition with respect to a spatial variable x is put. It is well-known that a solution of problem can be constructed in the form of convergent orthonormal series according to eigenfunctions of a spectral problem for an operator of multiple differentiation with periodic boundary conditions. Therefore Green's function can be also written in the form of an infinite series with respect to trigonometric functions (Fourier series). For classical first and second initial-boundary value problems there also exists a second representation of the Green's function by Jacobi function. In this paper we find the representation of the Green's function of the non-local initial-boundary value problem with periodic boundary conditions in the form of series according to exponents.

Throughout this note we mainly use techniques from [3-5].

Keywords: heat equation, initial-boundary value problems, periodic boundary condition, Green's function

2010 Mathematics Subject Classification: 5C15, 35E15, 35K05, 35K20

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