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APPROXIMATE CALCULATION OF DOUBLE INTEGRALS OF GENERAL TYPE TRIGONOMETRIC FUNCTIONS USING NEW INFORMATION OPERATORS

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The modern stage of development in many technical fields (such as astronomy, radiology, computer tomography, holography, radar technology) is characterized by the rapid implementation of new digital technologies, algorithms, and methods. Scientists are now faced with the challenge of creating new or improving known mathematical models, including mathematical models in digital signal and image processing, which contain new types of information input [1-2].

The task of approximate calculation of integrals from rapidly oscillating functions of two variables has both classical solutions and those for various types of input information [3-4]. Classic algorithms exist for calculating two-dimensional integrals from rapidly oscillating functions of general form, however, the issue of approximate calculation of double integrals from rapidly oscillating functions of general form using different information operators is less explored. Therefore, the question of studying quadrature formulas for approximate integral calculation from rapidly oscillating functions of general form is a relevant task.

The first step in solving such a task is the development of cubature formulas for the approximate calculation of double integrals from trigonometric functions of general form. In the works [5] cubature formulas have been constructed for the approximate calculation of double integrals from trigonometric functions of general form in cases where information about the function is given by its values on lines, and an effective algorithm for numerical integration with known function values at points has been presented. The aforementioned cubature formulas use new information operators in their construction (the interlineation operator and the interpolation operator based on the interlineant) with auxiliary functions in the form of piecewise splines.

The purpose of this research is to develop cubature formulas for the approximate calculation of double integrals from trigonometric functions of general form, which use new information operators (the interlineation operator and the interpolation operator based on the interlineant) with auxiliary functions in the form of piecewise-linear splines. The

goal is to obtain the error estimates for different classes of functions, to test the proposed cubature formulas, and to identify their potential capability.

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