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ABSTRACTS

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The coefficients of the optimal quadrature formula obtained by the method of phi-functions

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Numerical integration plays a great role in the fundamental and applied sciences. Depending on the initial data and requirements, there are imposed various conditions for the exactness of the approximate calculation of integrals. Classical methods for the numerical calculation of definite integrals are known, such as the quadrature formulas of Gregory, Newton-Cotes, Euler, Gauss, Markov, etc. Since the middle of the last century, the theory of constructing optimal numerical integration formulas based on variational methods began to develop. It should be noted that there are optimal quadrature formulas in the sense of Nikolskiy and Sard.

In this work, we study the problem of constructing the optimal quadrature formula in the sense of Sarda. We use the φ-function method for constructing a quadrature formula. The error of the formula is estimated from above with the help of the norm of the φ functions from the Hilbert space. We choose such a phi function the norm on this interval is minimal. Finally, with the help of the obtained φ function, we calculate the coefficient of the optimal quadrature formula. The resulting optimal quadrature formula is exact for functions $e^{\sigma x}$ and $e^{-\sigma x}$, where σ is a nonzero parameter.