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SELECTED PROBLEMS OF NUMERICAL CALCULATIONS OF DIFFER-INTEGRALS OF NON-INTEGER ORDERS

ABSTRACT *This paper presents methods of calculating numerically differ-integrals of non-integer orders. We evaluate the Riemann--Liouville formula in the context of the accuracy of the calculations. The point of reference is another popular formula – Grünwald-Letnikov – often used in technical applications because of its simplicity. By implementing transformations to the core integrand of the Riemann--Liouville formula we want to present the possible ways of reducing absolute errors while using this formula. We also test accuracy abilities of some methods of numerical integration: three Gauss quadratures and one Newton-Cotes formula. The test bed will be an interesting exponential function – often used in technical, practical applications. We will not discuss complexity of numerical calculations in details. We will focus solely on minimization of the absolute errors.*

Keywords: *numerical calculations, differential integrals, accuracy, errors, exponential function, fractional orders*