Quadrature formulas for calculating the hadamard integral of a special form

Galimyanov A., Vorontsova V., Gilemzyanov A., Gorskay T.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2016, International Journal of Pharmacy and Technology. All rights reserved.Currently, the issues related to finding solutions to some economic problems, such as problems pertaining to the queuing systems are of great interest. These problems, in turn, result in, inter alia, the need to calculate the Hadamard integrals of a special form. The study includes the construction of an optimal quadrature formula for the approximate solution to the Hadamard integral of a special form; such formula is selected depending on the singularities of integrals. This is because of the fact that an error of the quadrature formula for a hypersingular integral is a point function of any singularity. There is a movable singularity, when parameters of the quadrature formula do not depend on the singularity's position, and a fixed singularity, when the quadrature formula nodes are the singularity's point functions. In this way, choice of the quadrature formula nodes depends on the choice of singularities. Assessment of the constructed quadrature formula's error is established in the considered density class, and the order of formulas with arbitrary multiplicity nodes is optimized. The main results and conclusions are given; they were obtained for quadrature formulas of hypersingular integrals with the singularities, both movable and fixed, which can be used for solving boundary value problems, especially in simulating the fractional (or fractal) dynamic processes.

Keywords

Hadamard integrals, Optimization, Quadrature formulas