

Error bounds for weighted twopoint open and semi-open quadrature rules

(Talk)

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(joint work with Andrea Aglič Aljinović and Josip Pečarić)

The weighted Montgomery identity states that

$$f(x) = \int_a^b w(t) f(t) dt + \int_a^b P_w(x, t) f'(t) dt,$$

where $f : [a, b] \rightarrow \mathbf{R}$ is a differentiable function such that f' is integrable on $[a, b]$, $w : [a, b] \rightarrow [0, \infty)$ is some normalized weight function and $P_w(x, t)$ is the weighted Peano kernel. We use recently obtained generalization of weighted Montgomery identity to obtain new sharp weighted generalization of Ostrowski type inequality for functions whose derivatives belong to L_p spaces.

We use these results to obtain error bounds for the weighted two-point quadrature formulae of open and semi-open type. In particular, we apply all the results with some well-known weight functions. As special cases, the quadrature formulae of Radau and Gauss type and related inequalities are obtained.

MSC2010: 26D15, 41A55, 65D30.

Keywords: Montgomery identity, weighted 2-point rule, weight function, Radau rule, Gauss rule, open quadrature, semi-open quadrature.

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