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ABSTRACTS

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A generalization of product formulas

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In this paper we give a method for construction of cubature formulas, for approximate calculations of multiple integrals over regions: the n cube, the n simplex, the n sphere, and various cones, pyramids, prisms, cylinders and so forth, by using combinations, or products, of the generalized Turán quadratures. The case $s = 0$ is given in the books: Mysovskih ("Interpolating cubature formulas") and Stroud's ("Approximate calculation of multiple integrals"). We give a generalized case, $s \in \mathcal{N} \bigcup \{0\}$, where the values of integrand and its partial derivatives in nodes are given. This method is based on the results which are recently obtained by Gradimir V. Milovanović and the author for Turán's quadrature formulas.

Cubic spline difference scheme on a mesh of the Bakhvalov type

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The cubic spline difference scheme for solving singularly perturbed boundary value problem is considered. A non-uniform mesh of the Bakhvalov type is used in order to avoid the problem of stability. The second order of the uniform convergence with respect to perturbation parameter is obtained. The result is better than the one obtained on Shishkin's mesh.

An analysis of uniformly accurate spline difference method

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We are concerned with the numerical approximation by finite difference techniques of the linear two-point boundary value problem

$$L_\varepsilon y(x) \equiv \varepsilon y''(x) + p(x)y'(x) - d(x)y(x) = f(x), \quad x \in (0,1)$$