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The cubature formulas on a sphere invariant with respect to a dihedral group of rotations with inversion $D_{6h}$.
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Summary: An algorithm of searching for the best (in a sense) cubature formulas on a sphere that are invariant with respect to the dihedral group of rotations with inversion $D_{6h}$ is developed. This algorithm is applied to find parameters of all the best cubature formulas of this group of symmetry up to the 23rd order of accuracy $n$. In the course of the study carried out, the exact values of parameters of the corresponding cubature formulas are found for $n \leq 11$, and the approximate ones are obtained by the numerical solution of systems of nonlinear algebraic equations by a Newton-type method for the other $n$. For the first time, the ways of obtaining the best cubature formulas for the sphere are systematically investigated for the case of the group which is not a subgroup of the groups of symmetry of regular polyhedra.

MSC:
65D32 Numerical quadrature and cubature formulas
41A55 Approximate quadratures
41A63 Multidimensional problems

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invariant cubature formula; invariant polynomial; dihedral group of rotations; algorithm; sphere

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