

New superintegrable systems on N -dimensional spaces with non-constant curvature

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We review the construction of ND spaces endowed with $sl(2)$ -coalgebra symmetry. For all these spaces the geodesic flow is superintegrable, and the explicit form of their common set of integrals is obtained from the underlying $sl(2)$ -coalgebra structure. We also show that certain potentials can be also introduced in such a way that the superintegrability properties of the full system are preserved. As remarkable nonconstant curvature examples of this construction, the ND generalization of the four 2D Darboux spaces is presented [1], together with a new ND space coming from a quantum deformation of the $sl(2)$ coalgebra [2]. Moreover, one of the ND Darboux spaces admits the maximal number of functionally independent, quadratic integrals, thus being the first example of a maximally superintegrable Hamiltonian on an n -dimensional Riemannian space of nonconstant curvature.

References

- [1] Ballesteros A., Enciso A., Herranz F.J. and Ragnisco O., arXiv:math-ph/0612080; *ibid.* arXiv:0704.1470.
- [2] Ballesteros A., Herranz F.J. and Ragnisco O., *Physics Letters B*, **610** (107), 2005.