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A family of 3-integrable metrics

A Riemannian metric is called 3-*integrable* if its geodesic flow admits a first integral which is polinomial of third degree in momenta and which is independent from the energy integral. There is known only few examples of 3-integrable metrics. We obtain a big new family of 3-integrable metrics. Explicit formulae are obtained. The family contains three classical cases of 3-integrable metrics — Toda lattice, Holt potential and Goryachev-Chaplygin top. Part of these results is joint work with V. Matveev and H. Dullin.