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*The  $n$ -body problem in spaces of constant curvature*

In the 1830s, Bolyai and Lobachevsky independently extended the 2-body problem to spaces of negative constant curvature. Their work was continued by other mathematicians, including Lipschitz and Killing, who also considered the positive-curvature case. Schroedinger and Infeld later developed a quantum-mechanical analogue. But in spite of many recent results obtained in this direction by the Russian school of celestial mechanics, the problem was never generalized to more than 2 bodies. The goal of this talk is to derive the equations of motion of the  $n$ -body problem in spaces of constant curvature and to present some of the interesting properties these equations have. Among them are certain solutions that provide some new criteria towards understanding the large-scale geometry of the physical space.