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Dynamics of inversion of the tippe top

The tippe top has a shape of a truncated sphere with a peg attached to the flat surface. When spun sufficiently fast on its spherical bottom the tippe top turns upside down and continues motion on the peg.
Research on the tippe top has long history since 19-th century and it is presently understood that the gliding friction is responsible for inversion and that it takes place for the values of parameters $1-\alpha<\gamma=I_1/I_3<1+\alpha$ where $0<\alpha<1$ measures the eccentricity of the centre of mass.

The existing results say that all tippe top solutions approach asymptotically, in the sense of the LaSalle´ theorem, to one of the asymptotic, frictionless solutions that are periodic global attractors. The conditions of their stability as functions of initial conditions and values the parameters α,γ are well established now.

But the central problem of analysing the dynamics of the tippe top during flipping to the inverted spinning state remained unexplained. I shall present my recent results (Regular and Chaotic Dynamics, **13**(2008). 316-331) that provide tools to capture mathematically the whole dynamics of inversion.

I shall demonstrate the motion of the tippe top and I shall present a computer simulation of solutions.
