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What means to explain the motion 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 up 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 this phenomenon 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.

I shall present results of our work on the phase space picture of TT. It appears that under mild assumptions about the friction force the asymptotic frictionless solutions play a special role, they are periodic and they are global attractors. All solutions tend (in the sense of the LaSalle´ theorem) to one of the asymptotic solutions. We have discussed conditions of their stability and have described what happens to the TT in large for all values the parameters α, γ and all initial conditions.
But detailed dynamics of the Tippe Top, that is description of how a TT is rising to the inverted spinning state remained unexplained. I shall present my recent results that provide tools to capture mathematically the whole dynamics of inversion.

I shall demonstrate the motion of the Tippe Top and other rigid bodies.
