Search or Article-id

(Help | Advanced search)

All papers Go!

Nonlinear Sciences > Exactly Solvable and Integrable Systems

Tippe Top Equations and Equations for the Related Mechanical Systems

Nils Rutstam

(Submitted on 5 Apr 2012)

The equations of motion for the rolling and gliding Tippe Top (TT) are nonintegrable and difficult to analyze. The only existing arguments about TT inversion are based on analysis of stability of asymptotic solutions and the LaSalle type theorem. They do not explain the dynamics of inversion. To approach this problem we review and analyze here the equations of motion for the rolling and gliding TT in three equivalent forms, each one providing different bits of information about motion of TT. They lead to the main equation for the TT, which describes well the oscillatory character of motion of the symmetry axis $\mathbf{\hat{3}}$ during the inversion. We show also that the equations of motion of TT give rise to equations of motion for two other simpler mechanical systems: the gliding heavy symmetric top and the gliding eccentric cylinder. These systems can be of aid in understanding the dynamics of the inverting TT.

Submission history

From: Nils Rutstam [view email]

[v1] Thu, 5 Apr 2012 05:33:31 GMT (223kb,D)

Which authors of this paper are endorsers?

Link back to: arXiv, form interface, contact.

Download:

- PDF
- Other formats

Current browse context:

nlin.SI

< prev | next >

new | recent | 1204

Change to browse by:

math
math-ph
nlin
physics
physics.class-ph

References & Citations

- NASA ADS

Bookmark(what is this?)