

## New trends for the motion of a rigid body and dynamical systems

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*Abstract:* New advancements in terrestrial and cosmic technology require consideration of non-classical problems in dynamics. One of the important problems is the rotational motion of a rigid body about one of its fixed point whether is symmetric, about one of its principal axes, or asymmetric. In the present work, we consider the motion of a gyrostat under the influence of a gyrostatic moment vector and perturbing moments. It is assumed that, the center of mass is displaced slightly from the dynamic symmetry axis. The governing equations of motion are solved using one of the perturbation methods. The attained solutions are represented graphically to reveal the well effect of the applied moments and its impact on the stability of the body. The reinforce of the importance of this work is focused on the many applications in different fields such as aviation, submarines and so on.

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