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Abstract

Theory of gyroscopic effects for rotating objects

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Abstract:

More than two-centuries gyroscopic effects were presented analytically by the simplified models that did not match with practical results. The mathematician L. Euler described only one component of gyroscopic effects that is the change in the angular momentum. Other outstanding and ordinary scientists represented only some assumptions for gyroscopic properties. This is an unusual phenomenon in the physics of classical mechanics that can solve more complex problems than computing forces acting on the simple spinning disc and its motions. The recent research demonstrated the physics of the gyroscopic effects are more complex in mathematical models than represented in known theories. This problem solved by a new method based on the action of the system of inertial torques acting on the spinning objects that are produced by rotating mass. The system of nine interrelated inertial torques is acted on spinning objects around three axes and manifests all gyroscopic effects. Inertial torques are generated by the centrifugal, common inertial, Coriolis forces of the rotating mass, as well as the change in the angular momentum that acting on spinning objects. These torques represent the fundamental principles of the gyroscope theory. Gyroscopic effects are described by mathematical models of the inertial torques and explained their physics based on the potential and kinetic energy conservation law. A new analytical approach demonstrated the new phenomena of the deactivation of the inertial forces acting on the spinning objects, which physics is the result of the interrelations of inertial torques. Mathematical models for the gyroscopic effects are validated by practical tests. The new solution is represented as the breakthrough gyroscope theory. All problems of mechanical gyroscopes are resolved and closed the unresolved problem in classical mechanics.

Biography:

Dr. Ryspek Usubamatov studied Mechanical and Manufacturing Engineering at Bauman Moscow State Technical University that graduated in 1966 and received his PhD in 1972 at the same university. After several years of postdoctoral research he obtained the Dr. Tech. Sc at Kyrgyzstan Academy of Sciences. He has published more than 350 research manuscripts in reputed journals, 8 books, 30 brochures and 60 patents of inventions. His research interests are Productivity Theory for Industrial Engineering and Theory of Gyroscopic Effects. Currently, he is a Professor of Kyrgyz State Technical University after I. Razzakov, Kyrgyzstan.

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