Theory of gyroscopic effects

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Abstract

Since the Industrial Revolution, gyroscopic effects did not present analytically. This is an unusual phenomenon in classical mechanics which can solve more complex problems than computing forces acting on the simple rotating disc and motions of the gyroscope. The mathematician L. Euler described only one component of gyroscopic effects that is the change in the angular momentum. Other outstanding scientists presented only some simplified models for gyroscopic properties and physical interpretations of gyroscopic effects. The origin of the gyroscopic effects is simple in physics and more complex in mathematical models than represented in known theories. Today this problem solved by new principles based on the action of the system of inertial forces acting on the gyroscope that is produced by the rotating the mass of the spinning objects. The system of eight interrelated inertial torques is acted on a gyroscope and manifests it's the resistance and precession properties and all gyroscopic effects. Inertial torques is generated by the centrifugal, common inertial, Coriolis forces of the rotating mass and as well as the change in the angular momentum. Gyroscopic effects are described by mathematical models of the inertial torques and explained their physics. This torques presents the fundamental principles of the gyroscope theory. Nevertheless, a new analytical approach demonstrated the phenomena of the deactivation of the inertial forces acting on the gyroscope that need a deep study of the physics of this property. This is a new challenge for the physics of mechanics, i.e., probably there is non-inertial mechanics. Most mathematical models for the gyroscopic effects are validated by practical tests.

Biography

Dr. Ing. Ryspek Usubamatov graduated from the Bauman Moscow State Technical University. He is Professional Engineer in Mechanical, Manufacturing and Industrial Engineering, completed Ph.D. and Dr. Tech. Sc. He worked as engineer at a company and as a lecturer in universities of Kyrgyzstan and Malaysia. He has supervised around 100 Professional Engineers, 15 MSc and 8 PhD students. His key research are Productivity Theory for Industrial Engineering, Gyroscope Theory that represented by 8 books and more than 380 manuscripts in reputed journals and 60 patents of inventions. He is serving as an editorial board member of several repute international journals.

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