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4th International Conference and Exhibition on

Satellite & Space Missions

June 18-20, 2018 | Rome, Italy



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P-MMGP: Physics and Mathematical Models for Gyroscope Properties

The gyroscope property of maintaining the axis of a spinning rotor is used in gyroscopic devices for navigation and control systems in aerospace and other industries. Recent investigations in gyroscope area have demonstrated that the origin of gyroscope effects is more complex than represented in known mathematical models, which do not match the actual forces and motions. It is known that in a gyroscope are acting simultaneously and interdependently eight inertial torques around two axes, which manifest the resistance and precession torques and other properties. These torques are generated by action of centrifugal, common inertial and Coriolis forces of mass elements as well as the change in the angular momentum of the spinning rotor's center mass. Action of internal torques is a result of action of the external torque applied to a gyroscope. In engineering area, the gyroscopic devices can be loaded by several external torques acting around axes. Each external torque generates the internal inertial torques acting around two axes. The external torque applied to the gyroscope with one side support in direction of precession demonstrates its turn up around axis. Some researchers represent this effect as evidence of "gyroscope's antigravity property", which actually is the result of action of the internal torques. The new mathematical models for the gyroscope's internal torques based on action of the mass elements and center mass of the spinning rotor enable describing all gyroscope effects, properties and motions. Additionally, new analytical approach demonstrates new unknown gyroscope properties, which physics is hard to interpret.

Biography

Ryspek Usubamatov, Doctor Engineer graduated from Bauman Moscow State Technical University. Russia. He is a Professional Engineer in Mechanical, Manufacturing and Industrial Engineering, completed PhD in 1972 and Dr Tech Sc in 1993. He worked as an Engineer at a company and Lecturer in universities of Kyrgyzstan and Malaysia. He is a Professor of Razzakov Kyrgyz State Technical University. He has supervised around 100 Professional Engineer 15 MSc and 7 PhD students. His key research are productivity theory for industrial engineering, gyroscope theory and wind turbines represented by 7 books, 30 brochures and more than 300 manuscripts in reputed journals and 60 patents.

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