Ryspek Usubamatov

Kyrgyz State Technical University, Kyrgyzstan

Mathematical basis of gyroscope theory

Gyroscope devices are primary units for navigation and control systems in engineering. The main property of the gyroscopic device is maintaining the axis of a spinning rotor for which mathematical models have been formulated on the changes in the angular momentum. However, known theories for the gyroscope effects do not match actual forces and motions underway. The nature of the gyroscope properties is more complex than represented by contemporary theories. Recent investigations have demonstrated that gyroscope's spinning rotor with symmetrical location of the supports, have four basic inertial forces interdependently and simultaneously acting on them around two axes. These forces are generated by the mass elements and center mass of the spinning rotor and represented by centrifugal, Coriolis and common inertial forces as well as changes in angular momentum. The applied torque generates internal resistance torques that based on the action of centrifugal and Coriolis forces and the precession torques generated by common inertial forces and by the change in the angular momentum. The new mathematical models for gyroscope effects describe clearly and exactly the physics of all known and new gyroscope properties. New analytical approach for the most unsolvable motions of the gyroscope is validated by practical tests. Formulated mathematical models for acting torques in the gyroscope represent fundamental principles of gyroscope theory based on the action of inertial forces of classical mechanics. Mathematical models for gyroscope forces and motions can be solved manually. This new theoretical approach for the gyroscope problems represents new challenge in engineering science.

Biography

Ryspek Usubamatov has completed his graduation as Professional Engineer, PhD from Bauman Moscow State Technical University and Doctor of Technical Sciences from Academy of Sciences of Kyrgyzstan. He has worked as an Engineer-Designer of machine tools at engineering company. He is a Professor at Kyrgyz State Technical University and worked at universities in Malaysia. He has published more than 300 papers in reputed journals, more than 60 patents of inventions in engineering and seven books in area of manufacturing engineering. His research interests include gyroscope theory and productivity theory for industrial engineering.

ryspek0701@gmail.com
ryspek0701@yahoo.com

Notes:

Adv Robot Autom, an open access journal
ISSN: 2168-9695

Automation & Robotics 2017
June 28-29, 2017

Volume 6, Issue 2 (Suppl)

Page 41