

1. Record Nr.	UNINA9910863115103321
Autore	Usubamatov Ryspek
Titolo	Theory of Gyroscopic Effects for Rotating Objects : Gyroscopic Effects and Applications / / by Ryspek Usubamatov
Pubbl/distr/stampa	Springer Singapore, 2020 Singapore : , : Springer Singapore : , : Imprint : Springer, , 2020
ISBN	981-15-6475-2
Edizione	[1st ed. 2020.]
Descrizione fisica	1 online resource (271 pages)
Disciplina	531.11
Soggetti	Mechanics Physics Engineering mathematics Classical Mechanics Mathematical Methods in Physics Engineering Mathematics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Preface -- Abstract -- Nomenclature -- Chapter 1 Gyroscopic effects in engineering -- Chapter 2 Acceleration analysis of rotating object -- Chapter 3 Inertial forces acting on simple spinning objects -- Chapter 4 Properties and specifics of gyroscopic torques -- Chapter 5 Mathematical models for motions of a gyroscope suspended from the flexible cord -- Chapter 6 Mathematical models for motions of a gyroscope with one side support -- Chapter 7 Mathematical models for the top motions and gyroscope nutation -- Chapter 8 Gyroscopic effects of deactivation of inertial forces -- Appendix A -- Appendix B .
Sommario/riassunto	This book highlights an analytical solution for the dynamics of axially symmetric rotating objects. It also presents the theory of gyroscopic effects, explaining their physics and using mathematical models of Euler's form for the motion of movable spinning objects to demonstrate these effects. The major themes and approaches are represented by the spinning disc and the action of the system of interrelated inertial torques generated by the centrifugal, common inertial, Coriolis forces, as well as the change in their angular

momentum. These torques constitute the fundamental principles of the mechanical gyroscope theory that can be used for any rotating objects, like rings, cones, spheres, paraboloids and propellers of different designs. Lastly, the mathematical models for the gyroscopic effects are validated by practical tests.
