1. Record Nr. UNINA9910455949403321

| | |
|---|---|
| Autore | Harrison H |
| Titolo | Advanced Engineering Dynamics [[electronic resource]] |
| Pubbl/distr/stampa | Burlington, : Elsevier Science, 1997 |
| ISBN | 1-281-04706-6<br>9786611047061<br>0-08-052335-8 |
| Descrizione fisica | 1 online resource (315 p.) |
| Altri autori (Persone) | NettletonT |
| Disciplina | 620.1/04 21<br>620.104 |
| Soggetti | Dynamics<br>Dynamics. Mechanics, Applied<br>Mechanics, Applied<br>Civil & Environmental Engineering<br>Engineering & Applied Sciences<br>Civil Engineering<br>Electronic books. |
| Lingua di pubblicazione | Inglese |
| Formato | Materiale a stampa |
| Livello bibliografico | Monografia |
| Note generali | Description based upon print version of record. |
| Nota di contenuto | Front Cover; Advanced Engineering Dynamics; Copyright Page; Contents; Preface; Chapter 1. Newtonian Mechanics; 1.1 Introduction; 1.2 Fundamentals; 1.3 Space and time; 1.4 Mass; 1.5 Force; 1.6 Work and power; 1.7 Kinematics of a point; 1.8 Kinetics of a particle; 1.9 Impulse; 1.10 Kinetic energy; 1.11 Potential energy; 1.12 Coriolis's theorem; 1.13 Newton's laws for a group of particles; 1.14 Conservation of momentum; 1.15 Energy for a group of particles; 1.16 The principle of virtual work; 1.17 D' Alembert's principle; Chapter 2. Lagrange's Equations; 2.1 Introduction<br>2.2 Generalized co-ordinates2.3 Proof of Lagrange's equations; 2.4 The dissipation function; 2.5 Kinetic energy; 2.6 Conservation laws; 2.7 Hamilton's equations; 2.8 Rotating frame of reference and velocity-dependent potentials; 2.9 Moving co-ordinates; 2.10 Non-holonomic systems; 2.11 Lagrange's equations for impulsive forces; Chapter 3. |

Hamilton's Principle; 3.1 Introduction; 3.2 Derivation of Hamilton's principle; 3.3 Application of Hamilton's principle; 3.4 Lagrange's equations derived from Hamilton's principle; 3.5 Illustrative example; Chapter 4. Rigid Body Motion in Three Dimensions
4.1 Introduction4.2 Rotation; 4.3 Angular velocity; 4.4 Kinetics of a rigid body; 4.5 Moment of inertia; 4.6 Euler's equation for rigid body motion; 4.7 Kinetic energy of a rigid body; 4.8 Torque-free motion of a rigid body; 4.9 Stability of torque-free motion; 4.10 Euler's angles; 4.11 The symmetrical body; 4.12 Forced precession; 4.13 Epilogue; Chapter 5. Dynamics of Vehicles; 5.1 Introduction; 5.2 Gravitational potential; 5.3 The two-body problem; 5.4 The central force problem; 5.5 Satellite motion; 5.6 Effects of oblateness; 5.7 Rocket in free space; 5.8 Non-spherical satellite
5.9 Spinning satellite5.10 De-spinning of satellites; 5.11 Stability of aircraft; 5.12 Stability of a road vehicle; Chapter 6. Impact and One-Dimensional Wave Propagation; 6.1 Introduction; 6.2 The one-dimensional wave; 6.3 Longitudinal waves in an elastic prismatic bar; 6.4 Reflection and transmission at a boundary; 6.5 Momentum and energy in a pulse; 6.6 Impact of two bars; 6.7 Constant force applied to a long bar; 6.8 The effect of local deformation on pulse shape; 6.9 Prediction of pulse shape during impact of two bars; 6.10 Impact of a rigid mass on an elastic bar; 6.11 Dispersive waves
6.12 Waves in a uniform beam6.13 Waves in periodic structures; 6.14 Waves in a helical spring; Chapter 7. Waves in a Three-Dimensional Elastic Solid; 7.1 Introduction; 7.2 Strain; 7.3 Stress; 7.4 Elastic constants; 7.5 Equations of motion; 7.6 Wave equation for an elastic solid; 7.7 Plane strain; 7.8 Reflection at a plane surface; 7.9 Surface waves (Rayleigh waves); 7.10 Conclusion; Chapter 8. Robot Arm Dynamics; 8.1 Introduction; 8.2 Typical arrangements; 8.3 Kinematics of robot arms; 8.4 Kinetics of a robot arm; Chapter 9. Relativity; 9.1 Introduction
9.2 The foundations of the special theory of relativity

Sommario/riassunto

'Advanced Engineering Dynamics' bridges the gap between elementary dynamics and advanced specialist applications in engineering.It begins with a reappraisal of Newtonian principles before expanding into analytical dynamics typified by the methods of Lagrange and by Hamilton's Principle and rigid body dynamics. Four distinct vehicle types (satellites, rockets, aircraft and cars) are examined highlighting different aspects of dynamics in each case. Emphasis is placed on impact and one dimensional wave propagation before extending the study into three dimensions. Robotics is then looked a