
CONTENTS

1.	Introduction	2
1.1.	Definitions and basic concepts	2
1.2.	Newton's laws	3
2.	Dynamics of a particle	5
2.1.	Newton's equations of motion.....	5
2.2.	D'Alembert's principle – method of inertia forces	14
2.3.	Motion of a particle in a noninertial coordinate system.....	Chyba! Záložka nie je definovaná.
3.	Dynamics of systems of particles.....	Chyba! Záložka nie je definovaná.
3.1.	Newton's equations of motion for a system of particles	Chyba! Záložka nie je definovaná.
3.2.	Equations of motion formed by d'Alembert's method.....	20
3.3.	Meaning of dynamics of systems of bodies	22
4.	Inertial characteristics of a body	23
4.1.	Definitions of basic quantities	23
4.2.	Mass moments of inertia for parallel axes (parallel-axis theorem)	29
4.3.	Computation of moments of inertia of a rigid body.....	31
4.4.	Moment of inertia of a body with respect to an arbitrary axis and principal axes of inertia	32
5.	Dynamics of a body	39
5.1.	Translational motion of a body.....	39
5.1.1.	Newton's equations of motion	40
5.1.2.	Equations of motion formed by d'Alembert's method	41
5.2.	Rotational motion of a body	48
5.2.1.	Newton's equations of motion	49
5.2.2.	Equations of motion formed by d'Alembert's method	52
5.3.	General plane motion of a body	56
5.3.1.	Newton's equations of motion	56
5.3.2.	Equations of motion formed by d'Alembert's method	60
5.4.	Spherical motion of a body.....	62
5.4.1.	Euler's equations of motion	63
5.5.	General spatial motion of a body.....	66
5.5.1.	Newton's equations of motion	66
5.5.2.	Equations of motion formed by d'Alembert's method	69
6.	Dynamics of systems of rigid bodies	72
6.1.	Method of isolation.....	72
6.1.1.	Newton's equations of motion	73
6.1.2.	Equations of motion formed by d'Alembert's method	75
6.2.	Methods of general principles of dynamics.....	78
6.2.1.	Kinetic energy of a system of bodies	78
6.2.2.	Motion of the mass center of a system of bodies	80
6.2.3.	Linear momentum of a system of bodies	82
6.2.4.	Angular momentum of a system of bodies	82
6.3.	Method of reduction of mass and force quantities	82
7.	Theory of vibration	90
7.1.	Basic concepts	90
7.2.	Systems with one degree of freedom.....	91
7.3.	Equation of motion of a vibrating system	94

7.4.	Free undamped vibration of a system with one degree of freedom	100
7.5.	Free damped vibration of a system with one degree of freedom	102
Literature		105