Index

4	
A halian ground	m 9.4
Abelian groups	p.24
Adjoint operators	pp.43 - 44,87,103
Affine spaces	p.93
Autonomous systems	p.7
B Differentian	11 10.69 64
Bifurcation	pp.11 - 12,63 - 64
Body velocity	p.38
	4
Centroid of area	pp.4 - 6
Connection vector field	pp.118 - 119
Conservative vector fields	pp.145 - 146
Constraint, holonomic	pp.76 - 77
Constraint, nonholonomic	pp.110 - 117, 135 - 136
Cotangent bundle	p.126
Cotangent space	p.126
Cotangent vector	pp.127 - 130
Cross product	pp.1-2
Curl (vector)	p.145
Curvature (constraint)	pp.144 - 145
D	
Degrees of freedom	p.17
Diffeomorphic	p.20
Direct product of two sets	p.20
Direct sum	p.20
Direct sum of two sets	p.125
Directional linearity	p.106
Distribution (allowable velocities)	pp.112, 148 - 150
E	
Embedding	p.96
Equivalent vectors w.r.t. functions	pp.100 - 101
Euler-lagrange equation	p.136
Existence and uniqueness theorem	pp.11, 13
Exponential map	pp.48 - 51,103 - 104
External forces	p.1
F	
Force couple	p.2
Force couple system	p.3
Forward kinematics	pp.78, 83 - 84
Fundamental vector field (infinitesimal generators)	pp.99 - 100
G	
Gait generation	p.124
Generalized coordinates	p.78
Geodesics	pp.44 - 46, 51, 96 - 99
Gradient vector field	pp.129 - 130
	~ -

	Group	pp.21, 94 - 95
	Group invariant vectors	pp.21, 94 - 95 $p.100$
	Group, left/right action	pp.24 - 29, 33, 80, 96, 137
	Group, symmetry	pp.124 - 25, 35, 30, 30, 131 $pp.108 - 109, 137$
H	5.0ap, 5, mmoor,	PF. 100 100, 101
11	Holonomic constraint	pp.76 - 77
	Homeomorphic	p.19
	Hysteresis	pp.66, 70 - 71
I		FF:,
	Image (algebra)	p.124
	Internal forces	p.1
	Invariance	p.139
	Isomorphic	p.22
J	•	
	Jacobian	pp.84 - 86
K		
	Kernel	pp.124 - 125
	Kinematic locomotion	pp.105 - 107
L		
	Lie algebra	pp.41, 98 - 100, 103, 151 - 152
	Lie bracket	pp.148 - 150
	Lie groups	pp.21,96-99
	Lifted actions	pp.31 - 42, 52 - 54, 85, 137 - 138
	Linearity (mapping)	pp.106 - 107
	Linearization at a fixed point	pp.10 - 11
	Local connection	pp.114 - 117, 120, 122 - 123, 130, 142
	Locomotion	p.104
M		
	Manifolds	pp.17 - 19,93
	Manifolds, accessible	pp.76 - 78
	Manifolds, c^k -differentiable	p.20
	Manifolds, curvature	p.93
	Manifolds, topology	p.93
	Modular addition	p.21
	Momentum	pp.138 - 140
	Monotonic function	p.13
	Multiplicative calculus	pp.34 - 38,46 - 47
N		
	Noether's theorem	pp.131 - 134
	Noncommutativity	p.147
	Nonconservativity	pp.145 - 147
^	Nonholonomic constraint	pp.110 - 117, 135 - 136
0		107 107 100
	One-form	pp.125, 127 - 129
D	Optimal frame	p.83
P	Df. ff	111 117
	Pfaffian constraint	pp.111 - 117

Phase portrait	pp.7 - 9
Position trajectory	p.105
Potentials	p.17
Preimage (algebra)	p.124
Principally kinematic system	p.139
Principle of least action	pp.131 - 133
R	
Reaction force	p.4
Reconstruction equation	pp.114 - 123, 138
Rigid body	p.23
Rigid body, left lifted action	pp.38 - 41
Rigid body, right lifted action	pp.41 - 43
S	
Semidirect product of two sets	p.24
Shape trajectory	p.105
Spatial velocity	pp.43, 85
Special euclidean group	p.23
Special orthogonal group, $so(n)$	p.22
Symmetry	pp.108 - 109, 131
T	
Tangent spaces	pp.29 - 30
Tensor product	p.20
U	
Underactuated system	p.104
V	
Varignon's theorem	p.1
Vector field	pp.30 - 31
Vertical space	p.125
W	
Work (mechanical)	p.145
Z	
Zero set	pp.76, 110 - 111