CAMBRIDGE

Cambridge University Press
978-0-521-78088-9 - Lie's Structural Approach to PDE Systems
Olle Stormark
Index
More information

Index

$'\mathcal{P}$, 35, 454
$J^q(\mathbf{R}^n_x, \mathbf{R}^m_z)$, 20
$\delta(t)$, 399, 416
$\mathcal{C}(\mathcal{P})$, 62
$\mathcal{C}(\mathcal{V})$, 60
$\mathcal{P}_{\text{red}}$, 65
$\mathcal{P}_{\text{sing}}$, 508
$\mathcal{V}_{\text{red}}$, 61
$\mathfrak{G}^{(1)}$, 411
$\mathfrak{G}_L$, 180
$\mathfrak{G}_R$, 180
$\mathfrak{Gt}(\mathfrak{G})$, 397
$\mathfrak{st}(\mathfrak{G})$, 398
$\partial/\partial\pi^k$, 26
$\partial/\partial(\omega^i \wedge \omega^j)$, 480
Sys($\mathfrak{G}$), 401
graph$^{(q)}(f)$, 21
d/dx^i, 95
e-structure, 426
$e^{tX}(x)$, 195
q-graph, 21
q-jet, 20
$\pi_*(\text{Sys}(\mathfrak{G}))$, 402
sol$^q(\mathcal{S})$, 23
$^1Cont^{n,1}$, 18
$^qCont^{n,1}$, 168
$^qCt^{n,1}$, 168
$^qCt^{n,m}$, 21
$_L\psi^i_k$, 185
$_R\psi^i_k$, 183
1-graph, 16
1-parameter subgroup, 189

anti-derived system, 35, 454
arbitrariness of the general solution, 60
auxiliary variables, 379, 412

Bäcklund's theorems, 168

Cartan form, 382
Cartan's equivalence problem, 422
Cartan's local existence theorem, 52
Cartan's test for involutivity, 89
Cartan–Kähler theory, 54
Cauchy characteristic pfaffian system, 62
Cauchy characteristic vector field, 40, 60
Cauchy characteristic vector field system, 60
Cauchy characteristics, 65
Cauchy–Kowalewski theorem, 43
character, 42
classification of 3-dimensional Lie algebras, 229
complete integral, 29
complete pfaffian system, 26
complete vector field system, 26
completion of a vector field system, 132
contact bracket, 144
contact coordinates, 145
contact form, 17
contact pfaffian system, 21, 173
contact transformation, 18, 154
contact transformations of order q, 168
covariant derivative, 425

Darboux's method, 290
defining PDE system of a Lie pseudogroup, 156
derived system, 24
dimension of a pfaffian system, 24
dimension of a vector field system, 24
Drach's classification, 115
dual pfaffian system, 24
dual vector field system, 24

equivalence problem, 368, 421
equivalent Lie pseudogroups, 418
equivalent PDE systems, 272
essential invariants, 403
exp, 193

© Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-0-521-78088-9 - Lie's Structural Approach to PDE Systems
Olle Stormark
Index
More information

explicitly integrable vector field system, 161

first fundamental theorem for Lie groups, 202
first fundamental theorem for Lie pseudogroups, 382
first fundamental theorem for Lie pseudogroups, second version, 400
first integral, 10
first integral of the first order, 299
Frobenius's theorem, 27, 28

general involution, 42
generalized q-graphs, 23
generalized contact bracket, 138
genus (mod $\mathcal{P}$), 68

Hadamard's lemma, 47
hyperbolic Goursat equation, 304, 346
hyperbolic PDE, 121, 280

in involution with, 39
inessential invariants, 403
infinitesimal right transformations, 183
integrability condition, 97
integrable vector field system, 75, 318
integral curve, 65
integral manifold, 17
integral manifold of a pfaffian system, 22
integral manifold of a vector field system, 24
integrate a vector field or pfaffian system, 30
integration problem for a pfaffian system, 35
integration problem for a vector field system, 36
involution, 37
involutive genus, 42
involutive PDE system, 99
involutive structure, 90
involutive with respect to the independent variables, 80
isomorphic Lie pseudogroups, 417
isomorphic prolongation of a Lie pseudogroup, 381
isomorphic prolongation of a pseudogroup, 170

Jacobian form, 27
jet bundle, 20, 21

Killing algebra, 218
Killing vector field, 214

left multiplication, 180, 183
left-invariant diffeomorphism, 180
left-invariant parameter group, 180
left-invariant vector fields, 183
Lie algebra, 184
Lie equation, 241
Lie pseudogroup, 156
Lie structure of a pfaffian system, 35
Lie structure of a vector field system, xiv, 36
Lie vector field associated to a Lie algebra, 240
Lie vector field system, 252
Lie's rectification theorem for first order PDE systems, 167
lifted equivalence problem, 424
local 1-parameter group, 13
local equivalence, 368
local foliation, 27
local Lie group, 156, 175
local rectification lemma for vector fields, 10
locally isomorphic Lie groups, 177

Maurer–Cartan forms, 184, 202
Monge characteristic subsystem, 124
Monge characteristics, 124
Monge's method, 509

normal prolongation of a Lie pseudogroup, 413

parabolic Goursat equation, 458
parabolic PDE, 122, 280
pfaffian system, 8
polar functions, 145
principal subsystem, 298
principal vector field, 288
projective group, 13
prolongation of a contact transformation, 170
prolongation of a Lie pseudogroup, 380
prolongation of a PDE system, 96
prolongation of a pfaffian system, 83
prolongation of a vector field system, 83, 102
prolongation theorem for pfaffian systems, 107
prolongation theorem for local diffeomorphisms, 173
prolongation theorem for PDE systems, 99
pseudogroup, 155

reciprocal Lie algebras, 197
reciprocal Lie groups, 180
reduced characters, 88
reduced pfaffian system, 65
reduced vector field system, 61
regular involution, 42

© Cambridge University Press www.cambridge.org

CAMBRIDGE

Cambridge University Press
978-0-521-78088-9 - Lie's Structural Approach to PDE Systems
Olle Stormark
Index
More information

regular vector field, 40
resolved generators of a vector field system, 27
right multiplication, 180
right-invariant diffeomorphism, 180
right-invariant parameter group, 180
right-invariant vector field, 185

second fundamental theorem for Lie groups, 206
second fundamental theorem for Lie pseudogroups, 386
simple Lie algebra, 239
simply transitive Lie algebra, 246
singular involution, 42
singular subsystem, 124
singular vector field, 40
sol($\mathcal{S}$), 23
solvable Lie algebra, 239
source projection, 21
source transformation, 373
stability algebra, 398
stability group, 397
structurally equivalent Lie algebras, 222
structurally equivalent PDE systems, 370
structure constants of a Lie parameter group, 178
symmetry group of a PDE system, 276
systatic system, 401

target projection, 21
third fundamental theorem for Lie groups, 207
third fundamental theorem for Lie pseudogroups, 394
total derivative, 95

vector field system, 8

© Cambridge University Press www.cambridge.org