CAMBRIDGE
Cambridge University Press & Assessment
978-1-009-40244-6 — The Pinch Technique and its Applications to Non-Abelian Gauge Theories
John M. Cornwall , Joannis Papavassiliou , Daniele Binosi
Index
More Information

Index

antifields, 86
antighost equation, 99
asymptotic freedom, 1, 34, 36, 42
  and infrared slavery, *see* infrared slavery

background-field method, 19, 45
  gauge fields, 66–69
  Slavnov–Taylor identities functional, 92
  sources, 92
  Ward identities functional, 93
Background-quantum identities, 95
Batalin–Vilkovisky
  formalism, 88
  pinch technique formulation of, *see* pinch technique

center vortices, 152–156
  homotopy, and, 151
  confinement, and, 159–163
  entropy, and, 147
  exceptional groups, and, 148
  screening, 163
Chern–Simons action, 48
  dynamical gluon mass, and, 209
    Yang–Mills–Chern–Simons solitons, 214–216
  phases of, with dynamical mass, 211
Chern–Simons number, 209
  half-integral
    knots, and, 220
condensates, 3
  gluon mass, and, 47, 146
  quantum solitons, and, 145
confinement, 45, 53, 147
  baryons in $SU(3)$, 148, 162
  chiral symmetry breaking, and, 186
  functional Schrödinger equation, and, 192
  Georgi–Glashow model, in, 167, 181

effective action, 63
  background fields, scalar, 63–66
  infrared, 51
  two-particle irreducible, 64
effective charge, 134
  electroweak, 251
  QCD, 135
  QED, 134
  relation to physical cross sections, 252
electroweak theory, 2
  all-orders pinch technique, in, 55

Faddeev–Popov equation, 93
Feynman gauge, 2
  background fields, 62
  gauge, ghost, and Goldstone masses, 61
finite-temperature gauge theory, 31
  magnetic mass, and, 148
form factors
  gauge independent, 256
  neutrino charge radius, 259
functional Schrödinger equation, 201
  $d = 4$ coupling, and, 208
  effective action, 202
  gauge technique, and, 203

gauge fixing, 5–6
  background gauge fields, 67
  FLS gauge, 55
  't Hooft–Feynman, 55
  unitary gauge, 61
gauge technique, 50
  Abelian, 105–109
  general properties, 104
  massless longitudinal poles, in, 108–109, 112
  non-Abelian, 109–112
gauged nonlinear sigma model, 51
  massless scalars, and, 54
Gauss link number, 160
  Hopf fibration, and, 222
  Wilson loop, and, 160
generalized pinch technique, 71
Georgi–Glashow model, 55, 56, 167, 168, 181
gluon mass, 1, 46
  condensates, and, 46
  gauge technique, and, 112

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE
Cambridge University Press & Assessment
978-1-009-40244-6 — The Pinch Technique and its Applications to Non-Abelian Gauge Theories
John M. Cornwall , Joannis Papavassiliou , Daniele Binosi
Index
More Information

gluon mass (*cont.*)
generation in QCD, 49–55
hybrids, and, 164
lattice evidence for, 115–117
longitudinal massless fields, and, 48
positivity, and, 43
PT Schwinger–Dyson equations, and, 139
quantum solitons, and, 145–146
tachyon removal, and, 51
three dimensions, in, 197–201
Green's functions, 88
one-particle irreducible, 88
generating functional, 88
Gribov ambiguity, 53

homotopy, 151
first homotopy group, 151
Gauss linking number, and, 159
Hopf fibration, 222
Chern–Simons number, and, 222
hybrids, 164

infrared slavery, 1, 47–50, 105, 114, 190–199, 210–213, 273

Kugo–Ojima function, 99

Landau gauge
background formulation, 99
light-cone gauge, 31–34
pinch technique, 54

pinch technique, 1, 45
all-order, 75
background-Feynman correspondence, 69
in the background-field method, 71
Batalin–Vilkovisky formulation, 100
equal-time commutators, and, 59
finite temperature, 270
full thermal field theory, 274
zero-Matsubara-frequency sector, 272
four-gluon vertex, 30
gauge boson mass, and, 47
one-loop propagator, 6–17
one-loop three-gluon vertex, 20–30
resummation of resonant transition amplitudes, 263
Schwinger–Dyson equations, 126
algorithm, 119
construction, 120
solution, 131
truncation, 130
spontaneous symmetry breaking, with, 226
absorptive construction, 237
all-order construction, 246
conserved currents case, 229
differences with the symmetric case, 227
nonconserved current case, 242
physical thresholds, 240
unitary gauge case, 236
pinch technique, properties
absorptive parts
unitarity, and, 2, 34–36
intrinsic construction, 19
process independence, 17
propagator transversality, 127
and SUSY, 276
propagator positivity, 42–43

quantum solitons, 145–147

Slavnov–Taylor identities
for 1PI functions, 93
functional, 90
for Schwinger–Dyson kernels, 77, 95
s-t cancellation
all-order, 75
tree-level, 39
string theory, 3
supersymmetry (SUSY), 250, 276
symmetry breaking, Higgs–Kibble, 48
gauge boson mass, and, 55

three-dimensional gauge theories, 190
chromomagnetic field, and, 195
effective action, of, 193–195
magnetic mass, and, 191
one-loop gap equations, 197–201

Ward identities, 2
fermion propagator, 10
four-gluon vertex, 31
quark-gluon vertex, 20–23
three-gluon vertex, 8–10, 26, 34

© in this web service Cambridge University Press & Assessment www.cambridge.org