Index

Born approximation, 11

Cartwright–Levinson theorem, 180

Dirichlet-to-Neumann map, 25

factorization method, 54
  $(F^*F)^{1/4}$ method, 54, 64
  $F_\sharp$ method, 64
far field operator, 13, 29
far field pattern, 5

generalized linear sampling method, 42, 50, 64
  noise-free data, 42
  noisy data, 47
  regularized formulation, 46
Green's formula, 4

Herglotz kernel, 13
Herglotz wave function, 13
Holmgren's theorem, 3

ill-posed problems, 20
  regularization methods, 20
  Tikhonov regularization, 23
inf-criterion, 52
integral equation method, 97
interior transmission problem, 80, 109, 111
inverse problem, 17, 30
  uniqueness, 17, 30

Lax–Milgram lemma, 25
Legendre polynomial, 1
linear sampling method, 36, 63
Lippmann–Schwinger integral equation, 9, 10

media with voids, 84, 137
min-max principles, 127
mixed reciprocity relation, 29
modified interior transmission problem, 110
monotonicity property, 162

nonscattering wave numbers, 15, 30

operator, 126
  nonnegative, 126
  strictly coercive, 126

Paley–Wiener
  class, 179
  theorem, 179
Picard's theorem, 21

reciprocity principle, 12
refractive index, 8
Rellich's lemma, 6

scattering operator, 13
scattering problem, 7, 24
  anisotropic media, 24
  isotropic media, 7
sign changing contrast, 90, 105, 120, 145
Sommerfeld radiation condition, 2
spherical Bessel function, 2
spherical Hankel functions, 2
spherical harmonics, 1
spherical Neumann function, 2

transmission eigenvalue problem, 15, 30, 37, 120, 127–129, 157, 158, 160, 162
  inverse spectral theorem, 175, 182, 184
  spherically symmetric media, 130, 154, 173
transmission eigenvalues, 15, 30, 37
  absorbing media, 145
  anisotropic media, 109, 152, 154, 161
  determination form scattering data, 164, 165, 168
  discreteness, 84, 97, 104, 114, 117
  existence, 130, 139, 145, 152, 154
  inequalities, 140, 161
  isotropic media, 80, 130
  monotonicity, 140, 142, 162

unique continuation principle, 11

volume potential, 8

wave number, 8
weak scattering, 11