Symbols

$d^*_{\boldsymbol{ij}}$ alternative description of the components of the magnetic part of the rescaled Weyl tensor, page 264

$(\boldsymbol{e_a}, \Gamma_{\boldsymbol{a}}{}^{\boldsymbol{b}}{}_{\boldsymbol{c}}, \Xi, s, L_{\boldsymbol{ab}}, d^{\boldsymbol{a}}{}_{\boldsymbol{bcd}}, T_{\boldsymbol{ab}})$ unknowns in the frame version of the standard conformal field equations, page 196

$(\boldsymbol{e_a}, \hat{\Gamma}_{\boldsymbol{a}}{}^{\boldsymbol{b}}{}_{\boldsymbol{c}}, \hat{L}_{\boldsymbol{ab}}, d^{\boldsymbol{a}}{}_{\boldsymbol{bcd}}, T_{\boldsymbol{ab}}, \Xi, d_{\boldsymbol{a}})$ unknowns in the frame version of the extended conformal field equations, page 205

$(\boldsymbol{e}_{\boldsymbol{AA'}}, \Gamma_{\boldsymbol{AA'BC}}, \Xi, s, L_{\boldsymbol{AA'BB'}}, \phi_{\boldsymbol{ABCD}}, T_{\boldsymbol{AA'BB'}})$ unknowns in the spinorial version of the standard conformal field equations, page 199

$(\boldsymbol{e}_{\boldsymbol{AA'}}, \hat{\Gamma}_{\boldsymbol{AA'BC}}, \hat{L}_{\boldsymbol{AA'BB'}}, \phi_{\boldsymbol{ABCD}}, T_{\boldsymbol{AA'BB'}}, \Xi, d_{\boldsymbol{AA'}})$ unknowns in the spinorial version of the extended conformal field equations, page 208

$(\boldsymbol{o}, \boldsymbol{\iota})$ spin basis in index-free notation, page 66

$(\hat{\Sigma}_{\boldsymbol{AA'BB'}}, \hat{\Xi}^{\boldsymbol{C}}{}_{\boldsymbol{DAA'BB'}}, \hat{\Delta}_{\boldsymbol{CC'DD'BB'}}, \hat{\Lambda}_{\boldsymbol{BB'CD}}, \delta_{\boldsymbol{AA'}}, \varsigma_{\boldsymbol{AA'BB'}}, \gamma_{\boldsymbol{AA'BB'}})$ zero quantities in the spinorial extended conformal field equations, page 208

$(\hat{\Sigma}_{\boldsymbol{ab}}, \hat{\Xi}^{\boldsymbol{c}}{}_{\boldsymbol{dab}}, \hat{\Delta}_{\boldsymbol{cdb}}, \Lambda_{\boldsymbol{bcd}}, \delta_{\boldsymbol{a}}, \gamma_{\boldsymbol{ab}}, \varsigma_{\boldsymbol{ab}})$ zero quantities in the frame extended conformal field equations, page 205

$(\mathcal{M}, \boldsymbol{g})$ generic spacetime, page 45

$(\mathcal{U}, \varphi)$ coordinate chart, page 28

$(\Sigma_{\boldsymbol{AA'BB'}}, \Xi^{\boldsymbol{C}}{}_{\boldsymbol{DAA'BB'}}, Z_{\boldsymbol{AA'BB'}}, Z_{\boldsymbol{AA'}}, \Delta_{\boldsymbol{CDBB'}}, \Lambda_{\boldsymbol{BB'CD}}, Z, M_{\boldsymbol{AA'}})$ zero quantities in the spinorial version of the standard conformal equations, page 199

$(\Sigma_{\boldsymbol{ab}}, \Xi^{\boldsymbol{c}}{}_{\boldsymbol{dab}}, Z_{\boldsymbol{ab}}, Z_{\boldsymbol{a}}, \Delta_{\boldsymbol{cdb}}, \Lambda_{\boldsymbol{bcd}}, Z, M_{\boldsymbol{a}})$ zero quantities in the frame version of the standard conformal field equations, page 196

$(g_{ab}, \Xi, s, L_{ab}, d^{a}{}_{bcd}, T_{ab})$ unknowns in the metric standard conformal field equations, page 191

$(h_{ij},\ s_{ij},\ \zeta,\ \varsigma)$ unknowns in the conformal static equations, page 511

(o^A, ι^A) spin basis in abstract index notation, page 71

$(u, r, \theta^{\mathcal{A}})$ Bondi coordinates, page 236

$(x(\tau), \boldsymbol{\beta}(\tau))$ conformal geodesic with parameter τ, page 127

(x^μ) local coordinates in a four-dimensional manifold, page 28

$[\nabla_a, \nabla_b]$ commutator of covariant derivatives, page 39

$[[\boldsymbol{\xi}, \boldsymbol{\eta}]]$ antisymmetric product of $\boldsymbol{\xi}$, $\boldsymbol{\eta} \in \mathfrak{S}$, page 65

$[\boldsymbol{g}]$ conformal class of the metric $\boldsymbol{g}$, page 113

$[\boldsymbol{u}, \boldsymbol{v}]$ commutator of the vector fields $\boldsymbol{u}$ and $\boldsymbol{v}$, page 34

$\alpha_{\boldsymbol{a}}$, $\beta_{\boldsymbol{a}}$, $\omega_{\boldsymbol{a}}, \ldots$ components of the covectors $\boldsymbol{\alpha}$, $\boldsymbol{\beta}$, $\boldsymbol{\omega}, \ldots$ with respect to the frame $\{\boldsymbol{e}_{\boldsymbol{a}}\}$, page 51

α_a, β_a, $\omega_a, \ldots$ generic covectors in abstract index notation

$\approx$ diffeomorphism between sets, page 27

$\bar{\xi}^{A'}$, $\bar{\eta}_{A'}, \ldots$ complex conjugates of the spinors ξ^A, $\eta_B, \ldots$, page 72

β^2 norm of the covector $\tilde{\boldsymbol{\beta}}$, page 134

β_a covector associated to a conformal geodesic in abstract index notation, page 127

$\boldsymbol{\alpha}$, $\boldsymbol{\beta}$, $\boldsymbol{\omega}$, $\ldots$ generic covectors in index-free notation

$\boldsymbol{\beta}$ covector associated to a conformal geodesic in index-free notation, page 127

$\boldsymbol{\chi}$ Weingarten map, page 56

$\boldsymbol{D}$ generic three-dimensional connection in index-free notation

$\boldsymbol{d}$ rescaled conformal geodesic covector, page 201

$\boldsymbol{\delta}$ Euclidean metric on $\mathbb{R}^3$, page 143

$\boldsymbol{e}$, $\boldsymbol{e}_{\boldsymbol{AB}}$ space spinor irreducible components of the frame vector $\boldsymbol{e}_{\boldsymbol{AA'}}$, page 104

$\boldsymbol{\ell}$ three-dimensional Lorentzian metric on the conformal boundary of an anti-de Sitter-like spacetime, page 456

$\boldsymbol{f}$ covector defining a Weyl connection in index-free notation, page 119

$\boldsymbol{f}$ unphysical conformal geodesic covector, page 201

$\boldsymbol{g}$ generic four-dimensional Lorentzian metric tensor in index-free notation

$\boldsymbol{g}^\sharp$ generic contravariant four-dimensional Lorentzian metric tensor in index-free notation

$\boldsymbol{g}_{\mathscr{E}}$ standard metric on the Einstein cylinder, page 144

γ metric in the quotient manifold, page 141

$\boldsymbol{h}$ generic (negative definite) Riemannian three-dimensional metric

$\boldsymbol{\hbar}$ standard metric on the unit 3-sphere, page 142

$\boldsymbol{K}$ extrinsic curvature tensor of a hypersurface in index-free notation, page 61

$\boldsymbol{k}$ intrinsic metric of compact two-dimensional surfaces

$\boldsymbol{M}$, $\boldsymbol{N}, \ldots$ generic higher rank tensors in index-free notation

$\boldsymbol{N}$ tangent to the generators of null infinity

$\boldsymbol{\nabla}$, $\bar{\boldsymbol{\nabla}}$ generic linear connections in index-free notation, page 38

$\boldsymbol{\nu}$ unit normal to a hypersurface $\mathcal{S}$, page 54

$\boldsymbol{\omega}$, $\boldsymbol{\omega}^{\boldsymbol{AB}}$ space spinor irreducible components of the frame covector $\boldsymbol{\omega}^{\boldsymbol{AA'}}$, page 104

$\boldsymbol{\partial}_\mu$ coordinate basis vector

$\boldsymbol{Q}$ transition tensor between connections in index-free notation, page 42

$\boldsymbol{q}$ intrinsic metric of null infinity

$\boldsymbol{\Sigma}$ torsion tensor of a connection $\boldsymbol{\nabla}$ in index-free notation, page 39

$\boldsymbol{\sigma}$ standard metric on the unit 2-sphere

$\boldsymbol{\sigma}_{\mathbf{L}}(\boldsymbol{\xi})$ symbol of a differential operator $\mathbf{L}$, page 252

$\boldsymbol{t}$ vector field generating a timelike congruence

$\boldsymbol{\tau}$ vector counterpart of the spinor $\tau_{AA'}$, page 102

$\boldsymbol{v}$, $\boldsymbol{u}$, $\boldsymbol{w}, \ldots$ generic vectors in index-free notation

ς shear tensor, page 226
$\boldsymbol{z}$, $\boldsymbol{\zeta}$ deviation vector and covector, respectively, page 135
$\boldsymbol{\mathcal{L}_h}$ conformal Killing operator of the metric $\boldsymbol{h}$, page 257
$\breve{\mathbf{u}}$ perturbation quantity in an evolution system
$\chi_{(AB)CD}$ spinorial counterpart of the Weingarten tensor
χ_{AB} spinorial counterpart of the acceleration vector
$\circ$ composition of functions, page 36
$\coprod$ disjoint union of sets
$\delta(i)$ Dirac's delta, page 279
$\Delta_{\boldsymbol{h}}$ Laplacian operator of the Riemannian metric $\boldsymbol{h}$
$\delta_\mu{}^\nu$, $\delta_a{}^b$, $\delta_i{}^j$, $\delta_\alpha{}^\beta$, $\delta_A{}^B$, $\delta_{\boldsymbol{A}}{}^{\boldsymbol{B}}$, $\delta_{\boldsymbol{a}}{}^{\boldsymbol{b}}$, $\delta_{\boldsymbol{i}}{}^{\boldsymbol{j}}$ Kronecker's delta
$\delta_{\alpha\beta}$ components of the three-dimensional Euclidean metric in Cartesian coordinates, page 47
$\delta_{\boldsymbol{AB}}$ Sen connection on a timelike conformal boundary, page 471
$\delta_{\boldsymbol{ij}}$ components of a three-dimensional Riemannian metric with respect to an orthonormal basis, page 45
$\dot{\boldsymbol{\gamma}}(\mathrm{s})$ tangent vector to a curve, page 30
$\dot{\boldsymbol{x}}(\mathrm{s})$ alternative notation for the tangent vector to a curve, page 30
$\epsilon = \pm 1$ encodes the causal character of a hypersurface, page 54
$\epsilon_{\boldsymbol{abcd}}$ components of the volume form with respect to an orthonormal basis
$\epsilon_{\boldsymbol{AB}}$, $\epsilon^{\boldsymbol{AB}}$ components of the spinors ϵ_{AB}, ϵ^{AB} with respect to a spin basis, page 71
$\epsilon_{A'B'}$, $\epsilon^{A'B'}$ complex conjugates of the spinors ϵ_{AB}, ϵ^{AB}
$\epsilon_{AA'BB'CC'DD'}$ spinorial counterpart of the volume form, page 78
ϵ_{ABCDEF} spinorial counterpart of the three-dimensional volume form, page 105
ϵ_{abcd} volume form of a metric g_{ab}, page 49
ϵ_{AB}, ϵ^{AB} antisymmetric spinors, page 67
$\equiv$ definition
$\eta_{\boldsymbol{ABCD}}$ components of the electric part of the Weyl spinor, page 373
$\eta_{\boldsymbol{ab}}$ components of a four-dimensional Lorentzian metric with respect to an orthonormal basis, page 45
$\eta_{\mu\nu}$ components of the Minkowski metric tensor in Cartesian coordinates, page 47
ð, $\bar{\text{ð}}$ eth and eth-bar operators, page 241
exp exponential map, page 275
Γ geodesic distance, page 276
$\gamma(\mathrm{s})$ curve in a manifold with parameter s, page 30
$\Gamma_{\boldsymbol{a}}{}^{\boldsymbol{c}}{}_{\boldsymbol{b}}$ connection coefficients of $\boldsymbol{\nabla}$ with respect to $\{\boldsymbol{e_a}\}$
$\gamma_{\boldsymbol{i}}{}^{\boldsymbol{j}}{}_{\boldsymbol{k}}$ connection coefficients of the three-dimensional connection $\boldsymbol{D}$ with respect to the frame $\{\boldsymbol{e_i}\}$, page 59
$\Gamma_\mu{}^\nu{}_\lambda$ Christoffel symbols of the metric $\boldsymbol{g}$ in the coordinates (x^μ)
$\Gamma_{\boldsymbol{A'A'}}{}^{\boldsymbol{BB'}}{}_{\boldsymbol{CC'}}$ spinorial counterpart of the connection coefficients $\Gamma_{\boldsymbol{a}}{}^{\boldsymbol{b}}{}_{\boldsymbol{c}}$, page 82
$\Gamma_{\boldsymbol{AA'}}{}^{\boldsymbol{B}}{}_{\boldsymbol{C}}$ reduced spin connection coefficients, page 82

$\Gamma_{\boldsymbol{ABCD}}$ space spinor counterpart of the reduced spin connection coefficients $\Gamma_{\boldsymbol{AA'CD}}$, page 107
$\gamma_{\boldsymbol{AB}}{}^{\boldsymbol{C}}{}_{\boldsymbol{D}}$ reduced spatial spin connection coefficients, page 109
$\gamma_{\boldsymbol{AB}}{}^{\boldsymbol{CD}}{}_{\boldsymbol{EF}}$ spinorial counterpart of the three-dimensional connection coefficients $\gamma_{\boldsymbol{i}}{}^{\boldsymbol{j}}{}_{\boldsymbol{k}}$, page 109
$\grave{\Omega}$, $\check{\Omega}$ massless and, respectively, massive part of the conformal factor associated to Euclidean initial data sets, page 529
$\hat{\boldsymbol{\nabla}}$ generic Weyl connection in index-free notation, page 119
$\hat{\Gamma}_{\boldsymbol{a}}{}^{\boldsymbol{b}}{}_{\boldsymbol{c}}$ connection coefficients of a Weyl connection $\hat{\boldsymbol{\nabla}}$, page 119
$\hat{\Gamma}_{\boldsymbol{AA'}}{}^{\boldsymbol{B}}{}_{\boldsymbol{C}}$ reduced Weyl connection spin coefficients, page 206
$\hat{\nabla}_a$ generic Weyl connection in abstract index notation, page 119
$\hat{\rho}^{\boldsymbol{c}}{}_{\boldsymbol{dab}}$ Weyl connection algebraic curvature, page 203
$\hat{\rho}_{\boldsymbol{ABCC'DD'}}$ Weyl connection reduced spinorial algebraic curvature, page 207
$\hat{P}^{\boldsymbol{c}}{}_{\boldsymbol{dab}}$ Weyl connection geometric curvature, page 203
$\hat{P}_{\boldsymbol{ABCC'DD'}}$ Weyl connection reduced spinorial geometric curvature, page 207
κ conformal factor associated to the construction of the cylinder at spatial infinity, page 541
Λ Newman-Penrose Ricci scalar, page 87
λ cosmological constant, page 2
$\Lambda_{(\boldsymbol{ABCD})}$, $\Lambda_{\boldsymbol{AB}}$ irreducible components of the spinorial Bianchi equation, page 351
$\langle \boldsymbol{\omega}, \boldsymbol{v} \rangle$ action of the covector $\boldsymbol{\omega}$ on the vector $\boldsymbol{v}$
$\langle \boldsymbol{t} \rangle^{\perp}|_p$ subspace orthogonal to $\boldsymbol{t}$, page 55
$\langle \boldsymbol{t} \rangle$ one-dimensional subspace spanned by $\boldsymbol{t}$, page 55
$\langle\langle \boldsymbol{\xi}, \boldsymbol{\eta} \rangle\rangle$ Hermitian product of $\boldsymbol{\xi}, \boldsymbol{\eta} \in \mathfrak{S}$, page 94
$[\![\nabla_a, \nabla_b]\!]$ modified commutator of covariant derivatives, page 40
$\mathbb{H}^n$ n-dimensional half Euclidean space, page 29
$\mathbb{R}^+$ non-negative real numbers
$\mathbb{R}^2$ Euclidean plane
$\mathbb{R}^n$ n-dimensional Euclidean space
$\mathbb{S}^2$ 2-sphere
$\mathbb{S}^3$ three-dimensional unit sphere, page 142
$\mathbf{A}^*$ transpose of the complex conjugate of the matrix $\mathbf{A}$
$\mathbf{A}^3$ normal matrix in an initial boundary value problem, page 314
$\mathbf{A}^\mu$ symmetric matrices in a symmetric hyperbolic system, page 294
$\mathbf{d}$ exterior derivative (differential), page 31
$\mathbf{d}x^\mu$ coordinate basis covector
$\mathbf{L}$ generic differential operator
$\mathbf{L}^*$ formal adjoint of the differential operator $\mathbf{L}$
$\mathbf{L}_{\boldsymbol{h}}$ Yamabe operator, page 256
$\mathbf{T}$ map associated to the prescription of boundary conditions in an initial boundary value problem, page 314
$\mathbf{u}$, $\mathbf{v}$, $\mathbf{w}, \ldots$ $\mathbb{C}^N$-valued functions

$\mathcal{B}_a(p)$ ball of radius $a > 0$ centred at the point p
$\mathcal{C}_p$ null cone at a point $p \in \mathcal{M}$, page 45
$\mathcal{C}_p^+$, $\mathcal{C}_p^-$ future and, respectively, past null cone at a point $p \in \mathcal{M}$, page 45
$\mathcal{D}$ a generic derivation, page 30
$\mathcal{D}_{AB}$ Sen connection of $\nabla_{AA'}$ induced by $\tau_{AA'}$, page 105
$\mathcal{E}$ corner in an initial boundary value problem, page 314
$\mathcal{G}$ generic lens-shaped domain, page 301
$\mathcal{H}_k$ standard hyperboloids, page 154
$\mathcal{I}$ cylinder at spatial infinity, page 542
$\mathcal{I}^0$ intersection of the cylinder at spatial infinity with a Cauchy initial hypersurface, page 542
$\mathcal{I}^\pm$ critical sets where null infinity touches spatial infinity, page 542
$\mathcal{M}$, $\mathcal{N}$ generic (unphysical) spacetime manifolds
$\mathcal{N}$, $\mathcal{N}'$ initial null hypersurfaces in a characteristic problem, page 320
$\mathcal{N}_i$ complex null cone at i, page 522
$\mathcal{N}_{\mathbb{C}}(i)$ complexification of the null cone through i, page 532
$\mathcal{P}$ covariant derivative in the direction of $\tau_{AA'}$, page 105
$\mathcal{Q}$ generic quotient manifold, page 141
$\mathcal{R}$ generic subset of a hypersurface $\mathcal{S}$
$\mathcal{S}$ generic hypersurface on a manifold $\mathcal{M}$
$\mathcal{T}$ timelike boundary, page 314
$\mathcal{U}$, $\mathcal{V}$ generic open subsets of a manifold or $\mathbb{R}^n$
$\mathcal{U}_{\mathbb{C}}$ complexification of a neighbourhood $\mathcal{U}$ of the point at infinity, page 532
$\mathcal{Z}$ intersection of initial null hypersurfaces in a characteristic problem, page 320
$\mathfrak{S}$ complex vector space, page 65
$\mathfrak{S}(\mathcal{M})$ spin structure (spin bundle) over $\mathcal{M}$, page 81
$\mathfrak{S}(\mathcal{S})$ space spinor structure over a three-dimensional manifold $\mathcal{S}$, page 101
$\mathfrak{S}^*$ dual of the complex vector space $\mathfrak{S}$, page 65
$\mathfrak{S}^\bullet(\mathcal{M})$, $\mathfrak{S}_A(\mathcal{M})$, $\mathfrak{S}^A(\mathcal{M})$, $\mathfrak{S}_{AA'}{}^B(\mathcal{M}), \ldots$ various spin bundles over $\mathcal{M}$
$\mathfrak{S}^\bullet$ spin algebra, page 66
$\mathfrak{S}^A$, $\mathfrak{S}_A$, $\ldots$ alternative notation for the vector spaces $\mathfrak{S}$, $\mathfrak{S}^*, \ldots$, page 66
$\mathfrak{S}^{A'}$, $\mathfrak{S}_{A'B'}$, $\ldots$ complex conjugates of the spaces $\mathfrak{S}^A$, $\mathfrak{S}_{AB}, \ldots$, page 72
$\mathfrak{T}^\bullet(\mathcal{M})$ tensor bundle over $\mathcal{M}$, page 34
$\mathfrak{T}^a(\mathcal{M})$ alternative notation for the tangent bundle over $\mathcal{M}$, page 36
$\mathfrak{T}^{a_1\cdots a_k}{}_{b_1\cdots b_l}(\mathcal{M})$ alternative notation for the tensor bundle over $\mathcal{M}$, page 36
$\mathfrak{T}_a(\mathcal{M})$ alternative notation for the cotangent bundle over $\mathcal{M}$, page 36
$\mathfrak{X}(\mathcal{M})$ set of of scalar fields over $\mathcal{M}$, page 30
$\mathring{\mathbf{u}}$ background quantity in an evolution system
$\mathscr{C}$ generic cut of null infinity
$\mathscr{C}_\star$ fiduciary cut of null infinity
$\mathscr{E}$ extension operator of functions between Sobolev spaces, page 308
$\mathscr{I}$ part of the conformal boundary that is a hypersurface, page 178
$\mathscr{I}^\pm$ future and, respectively, past null infinity

$\mathscr{N}_i^+$, $\mathscr{N}_i^-$ null cones generated by the null geodesics through i, page 531
$\mathscr{N}_u$ outgoing null hypersurface associated to the retarded time u
$\mathscr{R}_{\boldsymbol{h}}$ linearised Ricci operator, page 289
$\mathscr{Z}$ generic intersection of null infinity with a null hypersurface
$\operatorname{int}\mathcal{A}$ topological interior of the set $\mathcal{A}$, page 397
i square root of -1
$\mu_{\boldsymbol{ABCD}}$ components of the magnetic part of the Weyl spinor, page 373
$\nabla_{\boldsymbol{a}}$ covariant directional derivative in the direction of $\boldsymbol{e_a}$, page 51
$\nabla_{\boldsymbol{u}}\boldsymbol{v}$ covariant derivative of $\boldsymbol{v}$ with respect to $\boldsymbol{u}$, page 38
∇_a, $\bar{\nabla}_a$ generic linear connections in abstract index notation, page 38
$\nabla_{\boldsymbol{AA'}}$ directional spinorial covariant derivative, page 82
$\nabla_{AA'}$, $\tilde{\nabla}_{AA'}, \ldots$ spinor covariant derivatives, page 81
∇_{AB} space spinor counterpart of $\nabla_{AA'}$, page 105
Ω generic three-dimensional conformal factor
$\oplus$ direct sum
$\otimes$ tensor product between tensors or tensor spaces
$\overline{\mathcal{A}}$ topological closure of the set $\mathcal{A}$, page 394
$\| \mathbf{u} \|_{\mathcal{S},m}$ Sobolev norm of order m of a function over $\mathcal{S}$, page 306
$\partial\mathbb{H}^n$ boundary of the n-dimensional half Euclidean space, page 29
$\partial\mathcal{M}$ boundary of $\mathcal{M}$
ϕ unphysical conformally coupled scalar field, page 216
ϕ_0 radiation field in the asymptotic characteristic problem on a cone, page 500
$\Phi_{ABA'B'}$ spinorial counterpart of the trace-free Ricci tensor, page 89
Φ_{ab} trace-free Ricci tensor of a connection ∇_a in abstract index notation, page 48
ϕ_{AB} unphysical Maxwell spinor, page 215
Π generic distribution, page 55
$\Pi\,|_p$ hyperplane induced by a distribution at a point $p \in \mathcal{M}$, page 55
$\pounds_{\boldsymbol{v}}$ Lie derivative in the direction of $\boldsymbol{v}$, page 37
Ψ_{ABCD} Weyl spinor, page 87
ρ boundary-defining function, page 285
ρ polar radial coordinate, page 514
ρ^α three-dimensional unit position vector, page 514
$\rho^{\boldsymbol{C}}{}_{\boldsymbol{DAA'BB'}}$ reduced spinorial algebraic curvature, page 198
$\rho^{\boldsymbol{c}}{}_{\boldsymbol{dab}}$ components of the algebraic curvature, page 195
$\rho^{AA'}$ spatial spinor used to introduce a $1+1+2$ spinor formalism, page 464
$\boldsymbol{Ric}$, $\boldsymbol{Ric}[\boldsymbol{g}]$ Ricci tensor of a connection $\boldsymbol{\nabla}$ in index-free notation, page 48
$\boldsymbol{Riem}$ Riemann curvature tensor of a connection $\boldsymbol{\nabla}$ in index-free notation, page 40
$\boldsymbol{Schouten}$, $\boldsymbol{Schouten}[\boldsymbol{g}]$ Schouten tensor of a connection $\boldsymbol{\nabla}$ in index-free notation, page 48
σ Newman-Penrose spin connection coefficient corresponding to $\Gamma_{\mathbf{01'00}}$
$\sigma^{\boldsymbol{a}}{}_{\boldsymbol{AA'}}$, $\sigma_{\boldsymbol{a}}{}^{\boldsymbol{AA'}}$ spacetime Infeld-van der Waerden symbols, page 74

$\Sigma_{\boldsymbol{a}}{}^{\boldsymbol{c}}{}_{\boldsymbol{b}}$ components of the torsion tensor with respect to an orthonormal frame, page 53

$\sigma_{\boldsymbol{i}}{}^{\boldsymbol{k}}{}_{\boldsymbol{j}}$, $\Pi^{\boldsymbol{k}}{}_{\boldsymbol{lij}}$, $\pi_{\boldsymbol{klij}}$ components of the three-dimensional torsion, geometric and algebraic curvatures, page 264

$\sigma_{\boldsymbol{i}}{}^{\boldsymbol{AB}}$, $\sigma^{\boldsymbol{i}}{}_{\boldsymbol{AB}}$ spatial Infeld-van der Waerden symbols, page 99

$\Sigma_a{}^c{}_b$ torsion tensor of a connection ∇_a in abstract index notation, page 39

$\simeq$ equality at the conformal boundary

$\square$ D'Alembertian operator, page 89

$\square_{AB}$ box commutator, page 89

$\overset{\star}{\simeq}$ equality at a fiduciary cut of null infinity

$\tau_{AA'}$ privileged timelike spinor inducing a space spinor formalism, page 102

Θ conformal factor associated to a conformal geodesic, page 132

$\theta = (\theta^{\mathcal{A}})$ local coordinates on $\mathbb{S}^2$

$\Theta_{\boldsymbol{ABCD}}$ space spinor counterpart of the components of the Schouten tensor of a Weyl connection, page 373

$\tilde{\boldsymbol{\eta}}$ Minkowski metric

$\tilde{\boldsymbol{g}}_{\mathscr{E}}$ metric of the anti-de Sitter spacetime, page 159

$\tilde{\boldsymbol{g}}_{\mathscr{S}}$ metric of the Schwarzschild spacetime, page 163

$\tilde{\boldsymbol{g}}_{dS}$ metric of the de Sitter spacetime, page 155

$\tilde{\mathcal{E}}_k$ asymptotic ends of asymptotically Euclidean manifold $\tilde{\mathcal{S}}$, page 272

$\tilde{\mathcal{F}}_{ab}$ self-dual Faraday tensor, page 213

$\tilde{\mathcal{M}}$ generic (physical) spacetime manifold

$\tilde{\phi}$ physical conformally coupled scalar field, page 216

$\tilde{\phi}_{AB}$ physical Maxwell spinor, page 215

$\tilde{\varrho}$ density of a perfect fluid, page 219

$\tilde{\varrho}$ energy density, page 254

$\tilde{F}_{ab}$ physical Faraday tensor, page 213

$\tilde{j}_k$ energy flux vector, page 254

$\tilde{p}$ pressure of a perfect fluid, page 219

$\tilde{T}_{ab}$ physical energy-momentum tensor

$\tilde{u}^a$ physical 4-velocity of a perfect fluid, page 219

$\underline{x}$ spatial coordinates (x^1, x^2, x^3)

Υ_a logarithmic gradient of a conformal factor, page 116

$\Upsilon_{AA'}$ spinorial counterpart of the logarithmic gradient of a conformal factor, page 123

φ^* pull-back, page 36

φ_* push-forward, page 36

$\varpi_{\boldsymbol{AA'}}$ components of $\varpi_{AA'}$ with respect to a spin basis, page 95

$\varpi_{AA'}$ Hermitian spinor assocated to a Hermitian inner product, page 95

ϱ conformally rescaled density of a perfect fluid, page 220

ϱ unphysical energy density, page 255

$\boldsymbol{Weyl}$, $\boldsymbol{Weyl}[\boldsymbol{g}]$ Weyl tensor of a connection $\boldsymbol{\nabla}$ in index-free notation, page 48

$\xi^{\boldsymbol{A}}$, $\eta_{\boldsymbol{A}}, \ldots$ components of the spinors ξ^A, $\eta_A, \ldots$ with respect to a spin basis

ξ^A, $\eta_A, \ldots$ generic spinors in abstract-index notation
$\xi_{\boldsymbol{ABCC}}$, $\chi_{\boldsymbol{ABCD}}$ real and imaginary parts of $\Gamma_{\boldsymbol{ABCD}}$, page 107
Ξ_{ij}, $S_{\boldsymbol{i}}$, S_{ij}, H_{kij} zero quantities associated to the conformal static field equations, page 511
$\zeta_0, \ldots \zeta_4$ components of the spin-2 zero-rest mass field ζ_{ABCD}, page 551
ζ_{ABCD} spin-2 zero-rest mass field, page 551
$\{\boldsymbol{c_i}\}$ global orthonormal frame on $\mathbb{S}^3$, page 142
$\{\boldsymbol{e_a}\}$ vector basis in index-free notation, page 31
$\{\boldsymbol{\omega^a}\}$ covector basis in index-free notation, page 31
$\{\mathcal{S}_t\}_{t\in\mathbb{R}}$ foliation of $\mathcal{M}$, page 54
$\{\boldsymbol{e_i}\}$ three-dimensional vector basis in index-free notation, page 59
$\{\boldsymbol{e_{AA'}}\}$ alternative index-free notation for the Newman-Penrose null tetrad, page 79
$\{\boldsymbol{e_{AB}}\}$, $\{\boldsymbol{\omega^{AB}}\}$ three-dimensional basis and cobasis with spin frame indices, page 109
$\{\boldsymbol{l}, \boldsymbol{n}, \boldsymbol{m}, \bar{\boldsymbol{m}}\}$ Newman-Penrose null tetrad in index-free notation, page 77
$\{\boldsymbol{\omega^i}\}$ three-dimensional covector basis in index-free notation, page 59
$\{\boldsymbol{\omega^{AA'}}\}$ soldering form, page 79
$\{\epsilon_{\boldsymbol{A}}{}^A\}$, $\{\epsilon^{\boldsymbol{A}}{}_A\}$ alternative abstract index notation for a spin basis and its dual, page 71
$\{\omega^{\boldsymbol{a}}{}_a\}$ covector basis in abstract index notation, page 36
$\{\omega^{\boldsymbol{i}}{}_i\}$ three-dimensional covector basis in index-free notation, page 59
$\{e_{\boldsymbol{a}}{}^a\}$ vector basis in abstract index notation, page 36
$\{e_{\boldsymbol{i}}{}^i\}$ three-dimensional vector basis in abstract index notation, page 59
$\{l^a, n^a, m^a, \bar{m}^a\}$ Newman-Penrose null tetrad in abstract index notation, page 77
$\{m,\, m_\alpha,\, m_{\alpha_1\alpha_2}, \ldots\}$ sequence of multipole moments of a static spacetime, page 519
b_{ABCD} Cotton spinor, page 512
C^*_p characteristic set of a symmetric hyperbolic system at the point p, page 297
C^∞ class of infinitely differentiable (smooth) functions
$C^\infty(\mathbb{R}^3, \mathbb{C}^N)$ space of smooth functions from $\mathbb{R}^3$ to $\mathbb{C}^N$, page 306
$C^c{}_{dab}$ Weyl tensor of a connection ∇_a in abstract index notation, page 48
C^k class of k-times differentiable functions
$C^k(\mathbb{R}^3, \mathbb{C}^N)$ set of C^k functions from $\mathbb{R}^3$ to $\mathbb{C}^N$, page 307
$C^k\big([0,T]; H^m(\mathbb{R}^3, \mathbb{C}^N)\big)$ set of C^k functions from $[0,T]$ to $H^m(\mathbb{R}^3, \mathbb{C}^N)$, page 307
D bounded open subset of $H^m(\mathbb{R}^3, \mathbb{C}^N)$ such that for $\mathbf{w} \in D$ the matrix $\mathbf{A}^0(0, \underline{x}, \mathbf{w})$ is positive definite bounded away from zero by $\delta > 0$ for all $p \in \mathbb{R}^3$, page 309
$D(\mathcal{R})$ domain of dependence of $\mathcal{R}$, page 304
D, Δ, δ, $\bar{\delta}$ Newman-Penrose directional covariant derivatives, page 92
$D^\pm(\mathcal{A})$, $D(\mathcal{A})$ future/past and total domain of dependence of a set $\mathcal{A}$, page 392

$d^a{}_{bcd}$ rescaled Weyl tensor, page 188
$d_{\boldsymbol{a}}$ components of the rescaled physical conformal geodesics covector, page 203
$D_{\boldsymbol{i}}$ three-dimensional directional covariant derivative in the direction of $\boldsymbol{e_i}$, page 59
D_i generic three-dimensional connection in abstract index notation
$D_{\boldsymbol{AB}}$ three-dimensional covariant directional derivative, page 109
$d_{\boldsymbol{ij}}$, $d_{\boldsymbol{ijk}}$ components of the electric and magnetic parts of the rescaled Weyl tensor, page 261
D_{AB} spinorial counterpart of a three-dimensional Levi-Civita connection $\boldsymbol{D}$, page 106
$F^{\boldsymbol{a}}(x)$, $F^{\mu}(x)$ coordinate gauge source functions, page 339
$f_{\boldsymbol{a}}$ components of the unphysical conformal geodesics covector, page 203
f_a covector defining a Weyl connection in abstract index notation, page 119
$F_{\boldsymbol{AB}}(x)$ frame gauge source functions, page 345
F_{ab} unphysical Faraday tensor, page 214
g^{ab} generic contravariant four-dimensional Lorentzian metric tensor in abstract index notation
G_{ab} Einstein tensor of a metric g_{ab}
g_{ab} generic four-dimensional Lorentzian metric tensor in abstract index notation
$H^{\pm}(\mathcal{A})$, $H(\mathcal{A})$ future/past and total Cauchy horizons of the set $\mathcal{A}$, page 394
$H^m(\mathbb{R}^3, \mathbb{C}^N)$ Sobolev space of order m of functions from $\mathbb{R}^3$ to $\mathbb{C}^N$, page 307
$h_a{}^b$ projector associated to a distribution Π, page 55
$h_{\boldsymbol{ABCD}}$ components of h_{ABCD} with respect to a spin frame $\{\epsilon_{\boldsymbol{A}}{}^A\}$, page 99
$h_{AA'}{}^{BB'}$ spinorial counterpart of the projector $h_{\boldsymbol{a}}{}^{\boldsymbol{b}}$, page 98
h_{ABCD} space spinor counterpart of $h_{AA'}{}^{BB'}$ and of a three-dimensional Riemannian metric, page 98
I generic interval in $\mathbb{R}$
i^0 spatial infinity
$i^{\pm}$ future and, respectively, past timelike infinity
$I^{\pm}(\mathcal{U})$ chronological future and, respectively, past of a set $\mathcal{U}$, page 391
$J^+(o, \mathcal{M}')$ set consisting of o and all points of $\mathcal{M}'$ which can be joined to o by a causal curve in $\mathcal{M}'$, page 497
$J^{\pm}(\mathcal{U})$ causal future and, respectively, past of a set $\mathcal{U}$, page 391
j_k unphysical flux vector, page 255
$J_{\boldsymbol{jk}}$, $J_{\boldsymbol{j}}$ normal components of the rescaled Cotton tensor, page 262
K_{ij} extrinsic curvature tensor of a hypersurface in abstract index notation, page 61
L_{ab} Schouten tensor of a connection ∇_a in abstract index notation, page 48
l_{ij} three-dimensional Schouten tensor, page 60
$p \prec\prec q$ timelike related points, page 391
p conformally rescaled pressure of a perfect fluid, page 220
$p \prec q$ strictly causally related points, page 391

$p \preceq q$ causally related points, page 391
$P^{\boldsymbol{C}}{}_{\boldsymbol{DAA'BB'}}$ reduced spinorial geometric curvature, page 198
$P^{\boldsymbol{c}}{}_{\boldsymbol{dab}}$ components of the geometric curvature, page 194
$P^{\boldsymbol{CC'}}{}_{\boldsymbol{DD'AA'BB'}}$ spinorial geometric curvature, page 197
$P_n^{(\alpha,\beta)}(\tau)$ Jacobi polynomial of degree n with parameters (α,β), page 553
$Q_a{}^b{}_c$ transition tensor between connections in abstract index notation, page 42
r three-dimensional Ricci scalar, page 60
$R(x)$ conformal gauge source function, page 348
R, $R[\boldsymbol{g}]$ Ricci scalar of a connection ∇_a, page 48
$R^{\boldsymbol{c}}{}_{\boldsymbol{dab}}$ components of the Riemann tensor with respect to an orthonormal frame, page 53
$R^d{}_{cab}$ Riemann curvature tensor of a connection ∇_a in abstract index notation, page 40
$r^k{}_{lij}$ three-dimensional Riemann curvature tensor in abstract index notation, page 60
$r_{ABCDEFGH}$ spinorial counterpart of the three-dimensional Riemann curvature tensor, page 110
R_{ab} Ricci tensor of a connection ∇_a in abstract index notation, page 48
r_{ACEFGH}, r_{ABCE} reduced three-dimensional curvature spinors, page 110
$R_{CC'DD'AA'BB'}$ spinorial counterpart of the Riemann curvature tensor, page 86
$R_{CDAA'BB'}$ reduced Riemann curvature spinor, page 86
r_{ij} three-dimensional Ricci tensor in abstract index notation, page 60
s the Friedrich scalar, page 186
s_{ABCD} spinorial counterpart of the three-dimensional trace-free Ricci tensor, page 110
s_{ij} three-dimensional trace-free Ricci tensor, page 60
$SO(3)$ three-dimensional special orthogonal group
$T(\mathcal{M})$ tangent bundle over $\mathcal{M}$, page 34
$T\,|_p\,(\mathcal{M})$ tangent space at a point $p \in \mathcal{M}$, page 31
$T^*(\mathcal{M})$ cotangent bundle over $\mathcal{M}$, page 34
$T^*\,|_p\,(\mathcal{M})$ cotangent space at a point $p \in \mathcal{M}$, page 31
$T^\bullet\,|_p\,(\mathcal{M})$ tensor algebra at $p \in \mathcal{M}$, page 33
$T^k_l\,|_p\,(\mathcal{M})$ space of (k,l)-tensors at the point $p \in \mathcal{M}$, page 33
$T^{a_1\cdots a_k}{}_{b_1\cdots b_l}$ arbitrary (k,l)-tensor in abstract index notation
T_{ab} unphysical energy-momentum tensor
T_{cdb} rescaled Cotton tensor, page 189
u retarded time
U, $X^{\mathcal{A}}$, ω, $\xi^{\mathcal{A}}$ components of an adapted frame in the asymptotic characteristic problem, page 482
u, v retarded and, respectively, advanced time coordinates
$u^{\boldsymbol{a}}$, $v^{\boldsymbol{a}}$, $w^{\boldsymbol{a}}, \ldots$ components of the vectors $\boldsymbol{u}$, $\boldsymbol{v}$, $\boldsymbol{w}$ with respect to the coframe $\{\boldsymbol{\omega}^{\boldsymbol{a}}\}$, page 51

u^a unphysical 4-velocity of a perfect fluid, page 220
u^a, v^a, w^a, ... generic vectors in abstract index notation
v norm of a static Killing vector, page 504
$x(\mathrm{s})$ alternative notation for a curve with parameter s, page 30
X_{CDAB}, $Y_{CDA'B'}$ curvature spinors, page 86
$Y[\boldsymbol{h}]$ Yamabe invariant, page 280
Y_{abc} four-dimensional Cotton tensor, page 116
y_{ijk} three-dimensional Cotton tensor, page 118
y_{ij} three-dimensional Cotton-York tensor, page 118
$z_{\boldsymbol{AA'}}$, z, $z_{(AB)}$ spacetime and space spinor components of the spinorial counterpart of the deviation vector of a congruence of conformal geodesics, page 383
${}^*F_{ab}$ Hodge dual of an antisymmetric tensor F_{ab}, page 50
${}^*R_{abcd}$, R^*_{abcd} left and, respectively, right duals of the tensor R_{abcd}, page 50
$^+$ Hermitian conjugation, page 96
†, ‡ generalised dualisation operations, page 50
$^\sharp$, $^\flat$ musical operators, page 44
$_\alpha$, $_\beta$, $_\gamma$, ... spatial coordinate indices
$_{\boldsymbol{A}}$, $_{\boldsymbol{B}}$, $_{\boldsymbol{C}}$, ... spinor frame indices, page 74
$_{\boldsymbol{a}}$, $_{\boldsymbol{b}}$, ... spacetime frame indices ranging $\mathbf{0}, \ldots, \mathbf{3}$
$_{\boldsymbol{i}}$, $_{\boldsymbol{j}}$, $_{\boldsymbol{k}}$, ... frame indices ranging either $\mathbf{0}$, $\mathbf{1}$, $\mathbf{2}$ or $\mathbf{1}$, $\mathbf{2}$, $\mathbf{3}$
$_\perp$ perpendicular component
$_\mu$, $_\nu$, $_\lambda$, ... spacetime coordinate indices
$_A$, $_B$, $_C$, ... abstract spinor indices, page 66
$_a$, $_b$, $_c$ ... abstract spacetime indices
$_i$, $_j$, $_k$, ... abstract spatial indices
${}_sY_{lm}$ spin-weighted spherical harmonics
$_{(a_1 \cdots a_l)}$ symmetrisation over the indices $_{a_1 \cdots a_l}$, page 36
$_{[a_1 \cdots a_l]}$ antisymmetrisation over the indices $_{a_1 \cdots a_l}$, page 36
$_\mathcal{A}$, $_\mathcal{B}$, ... arbitrary string of indices
$_{\{a_1 \cdots a_l\}}$ symmetric trace-free part over the indices $_{a_1 \cdots a_l}$, page 47