

GLOSSARY OF SYMBOLSScalars :

- a : Specific angular momentum of the Kerr-Newman black hole.
 c : Velocity of light
 e : Charge of the black hole.
 e : Proper energy density of a fluid.
 μ : Magnitude of the magnetic field vector
 $I_m \phi_1$: Imaginary part of ϕ_1 .
 m : Mass of the Kerr-Newman black hole.
 p : Proper hydrostatic pressure.
 q : Energy density of neutrino
 $Re \phi_1$: Real part of ϕ_1 .

Complex current scalars (3) :

- I_0 : $J^a \underline{l}_a$.
 I_1 : $J^a m_a$.
 I_2 : $J^a n_a$.

Intrinsic Derivative symbols (4) :

- D : $;\underline{a}^1$.
 Δ : $;\underline{a}^n$.
 δ : $;\underline{a}^m$.
 $\bar{\delta}$: $;\underline{a}^{\bar{m}}$.
 ∇_a : $;\underline{a}$

Parameters :

- Θ : Expansion of u_a .
 $\Theta_{(\underline{1})}$: Expansion of \underline{l}^a .
 $\Theta_{(n)}$: Expansion of n^a .
 $\Theta_{(m)}$: Expansion of m^a .
 $\bar{\sigma}_{(\underline{1})}$: $(1/2 \begin{matrix} o_{ab} & o_{ab} \\ (\underline{1}) & (\underline{1}) \end{matrix})^{1/2}$
 $w_{(\underline{1})}$: $(1/2 \begin{matrix} w_{ab} & w_{ab} \\ (\underline{1}) & (\underline{1}) \end{matrix})^{1/2}$

Vectors :

- e_a^α : Tetrad (u_a, q_a, r_a, h_a) .
 h_a : Space-like unit vector.
 H_a : Space-like magnetic field vector.
 $(H)_a$: Complexion vector
 J_a : Current vector
 \underline{l}_a : Real null congruence
 m_a : Complex null congruence
 n_a : Real null congruence
 u_a : Flow vector of matter
 u_a : Acceleration vector
 Z_a^α : Complex null tetrad $(\underline{l}_a, m_a, \bar{m}_a, n_a)$
 Z_α^a : Dual of Z_a^α $(n^a, \bar{m}^a, -m^a, \underline{l}^a)$

Tensors :

- C_{abcd} : Weyl-conformal tensor
 E_{ab} : Trace-free electromagnetic energy momentum tensor
 F_{ab} : Electromagnetic field tensor.

(xiv)

- $*F_{ab}$: Dual of F_{ab} .
- h_{ab} : 3-dimensional projection operator
- J_{abc} : Matter current.
- M_{ab} : Self dual of F_{ab} .
- N_{ab} : Anti-self dual part of F_{ab} .
- N_{ab}^c : Nijenhuis tensor.
- P_{ab} : 2-dimensional projection operator
- R_{ab} : Ricci tensor.
- R_{abcd} : Riemann Christoffer curvature tensor.
- Z_{ab}^c : Zitch Tensor.
- ϵ_{abcd} : Levi-Civita permutation symbol.
- γ_{ab} : 2-Dimensional complex null projection operator.
- γ_{ab}^* : 2-Dimensional real null projection operator.
- γ_{bc}^a : Ricci coefficient of rotation.
- $\widehat{\sigma}_{ab}$: Shear tensor of u_a .
- $\widehat{\sigma}_{(\underline{1})ab}$: 'Complete' shear tensor of $\underline{1}^a$.
- w_{ab} : Rotation tensor of u_a .
- $\widehat{w}_{(\underline{1})ab}$: 'Complete' rotation tensor of $\underline{1}^a$.
- $\widehat{\theta}_{(\underline{1})ab}$: 'Complete' Deformation tensor of $\underline{1}^a$.