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Schwarzschild Solution of the Generally Covariant Quaternionic Field Equations of Sachs HORACE CRATER, The University of Tennessee Space Institute — Sachs has derived quaternion field equations that fully exploit the underlying symmetry of the principle of general relativity, one in which the fundamental 10 component metric field is replaced by a 16 component four-vector quaternion. Instead of the 10 field equations of Einstein's tensor formulation, these equations are 16 in number corresponding to the 16 analytic parametric functions $\partial x^{\mu'}/\partial x^{\nu}$ of the Einstein Lie Group. The difference from the Einstein equations is that these equations are not covariant with respect to reflections in space-time, as a consequence of their underlying quaternionic structure. These equations can be combined into a part that is even and a part that is odd with respect to spatial or temporal reflections. This paper constructs a four-vector quaternion solution of the quaternionic field equation of Sachs that corresponds to a spherically symmetric static metric. We show that the equations for this four-vector quaternion corresponding to a vacuum solution lead to differential equations that are identical to the corresponding Schwarzschild equations for the metric tensor components.

Horace Crater
The University of Tennessee Space Institute

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