Differential Operators Associated to the Cauchy-Fueter Operator in Quaternion Algebra

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Abstract: This paper deals with the initial value problem of the type {Mathematical expression} {Mathematical expression}where t is the time, L is a linear first order operator (matrix-type) in Quaternionic Analysis and {Mathematical expression} is a regular function taking values in the Quaternionic Algebra. The article proves necessary and sufficient conditions on the coefficients of operator L under which L is associated to the Cauchy-Fueter operator of Quarternionic Analysis. This criterion makes it possible to construct the operator L for which the initial problem (1), (2) is solvable for an arbitrary initial regular function {Mathematical expression} and the solution is also regular for each t. © 2011 Springer Basel AG.
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