

# 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  $\{ \text{Mathematical expression} \}$   $\{ \text{Mathematical expression} \}$  where  $t$  is the time,  $L$  is a linear first order operator (matrix-type) in Quaternionic Analysis and  $\{ \text{Mathematical expression} \}$  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 Quaternionic 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  $\{ \text{Mathematical expression} \}$  and the solution is also regular for each  $t$ . ?? 2011 Springer Basel AG.  
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