

Linear fractional differential equations for second kind modified Bessel functions

Authors : Jorge Olivares, Fernando Maass, Pablo Martin

Abstract : Fractional derivatives have been considered recently as a way to solve different problems in Engineering. In this way, second kind modified Bessel functions are considered here. The order α fractional differential equations of second kind Bessel functions, $K_\nu(x)$, are studied with simple initial conditions. The Laplace transform and Caputo definition of fractional derivatives are considered. Solutions have been found for $\nu=1/3, 1/2, 2/3, -1/3, -1/2$ and $(-2/3)$. In these cases, the solutions are the sum of two hypergeometric functions. The α fractional derivatives have been for $\alpha=1/3, 1/2$ and $2/3$, and the above values of ν . No convergence has been found for the integer values of ν . Furthermore when α has been considered as a rational found m/p , no general solution has been found. Clearly, this case is more difficult to treat than those of first kind Bessel Function.

Keywords : Caputo, modified Bessel functions, hypergeometric, linear fractional differential equations, transform Laplace

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