Hypergeometric Solutions to Linear Nonhomogeneous Fractional Equations with Spherical Bessel Functions of the First Kind

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Abstract : The use of fractional derivatives to different problems in Engineering and Physics has been increasing in the last decade. For this reason, we have here considered partial derivatives when the integral is a spherical Bessel function of the first kind in both regular and modified ones simple initial conditions have been also considered. In this way, the solution has been found as a combination of hypergeometric functions. The case of a general rational value for α of the fractional derivative α has been solved in a general way for alpha between zero and two. The modified spherical Bessel functions of the first kind have been also considered and how to go from the regular case to the modified one will be also shown.

Keywords : caputo fractional derivatives, hypergeometric functions, linear differential equations, spherical Bessel functions
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