

On the Distinguished Role of the Mittag-Leffler and Wright Functions in Fractional Calculus

Francesco Mainardi
Dipartimento di Fisica ed Astronomia
University of Bologna
Bologna, Italy

Fractional calculus, in allowing integrals and derivatives of any positive real order (the term "fractional" is kept only for historical reasons), can be considered a branch of mathematical analysis which deals with integro-differential equations where the integrals are of convolution type and exhibit (weakly singular) kernels of power-law type. As a matter of fact fractional calculus can be considered a laboratory for special functions and integral transforms. Indeed many problems dealt with fractional calculus can be solved by using Laplace, Fourier and Mellin transforms and lead to analytical solutions expressed in terms of functions of the Mittag-Leffler and Wright type. We outline these problems in order to single out the role of these functions.