Berberan-Santos, Mário N.

Properties of the Mittag-Leffler relaxation function. (English) Zbl 1101.33015

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Summary: The Mittag-Leffler relaxation function, $E_\alpha(-x)$, with $0 \leq \alpha \leq 1$, which arises in the description of complex relaxation processes, is studied. A relation that gives the relaxation function in terms of two Mittag-Leffler functions with positive arguments is obtained, and from it a new form of the inverse Laplace transform of $E_\alpha(-x)$ is derived and used to obtain a new integral representation of this function, its asymptotic behaviour and a new recurrence relation. It is also shown that the fastest initial decay of $E_\alpha(-x)$ occurs for $\alpha = 1/2$, a result that displays the peculiar nature of the interpolation made by the Mittag-Leffler relaxation function between a pure exponential and a hyperbolic function.

MSC:

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44A10 Laplace transform

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References: