This is a review text file submitted electronically to MR.

Reviewer: Znojil, Miloslav

Reviewer number:

Address:
Theory Group,
NPI Rez
250 68 Czech Republic
znojil@ujf.cas.cz

Author: This line will be completed by the MR staff.

Short title: This line will be completed by the MR staff.

Control number: 2077514

Primary classification: 26A33

Secondary classification(s): 45J05 81S99

Review text:

The title of this paper is misleading. Fortunately, its contents is interesting and it is not difficult to re-arrange the message in comprehensible form. One simply has to start - and continue - reading from the end. The last Appendix B introduces the first idea by reminding us that it is easy to generalize exponentials exp(x) to Mittag-Lefler functions E(x) defined by Taylor series with a new free parameter ν. The second idea may be found in the Appendix A. There, one imagines that the relationship between the exponentials exp(x) and certain elementary differential equations may be also paralleled by a similar relationship between the Mittag-Lefler functions E(x) and certain less elementary integro-differential equations called, for the sake of brevity (though at an expense of clarity) fractional-differential equations. Then, the third input idea appears, in the rationalized ordering of my own re-presentation, in section VI where one imagines that the Schroedinger and Klein-Gordon description of the time-evolution of the system (i.e., the respective first- and second-order differential equations with respect to time) may be interpreted as the two specific integer-parameter special cases of the generalized, "fractional-differential" equations of the above-mentioned type. Now the reader is prepared to start experimenting with the latter generalized equations in special cases, being assisted by the two most elementary examples as outlined in sections IV and V. Finally, being already firmly aware that all that nice game has definitely nothing in common with physics, the kind reader may continue reading section III where the fractional derivative is decomposed into integral derivative plus a remainder. For the sake of brevity, we are offered just the Schroedinger-like-looking option with the order of the separated differentiation equal to one, and we are informed that the residual term has almost as many nasty properties as many of us have already expected. Still, being pretty sure now that all the objects with pretty names (like "probability density" etc) have really nothing in common with the standard physics (while no alternative physics can be offered within 14 pages of the text of course), we feel no objections reading, finally, sections II (clarifying the ambiguities and the correct usage of units) and Introduction (where we are painfully guided towards a few further speculative ideas about possible connections of what we just read to several areas of the real physics ranging from the problems of diffusion (in condensed matter etc) and of random walks till non-Markovian processes and, perhaps, also quantum mechanics. Feeling satisfied by what we were told, consulting a few recommended related references could be our next step.