

**REPRINTED PAPER * by M. CAPUTO, from
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EDITORIAL NOTE: Nowadays, there are several basic definitions for the operators of differentiation and integration of fractional (arbitrary) order, as objects of the classical Fractional Calculus (FC). One of them is commonly known as the *Caputo derivative*. Appearing as a strange theoretical analogue of the conventional Calculus, with a very long and controversial history, FC has been recently recognized both by pure mathematicians and applied scientists and engineers, as an efficient and irreplaceable tool in modeling phenomena of the real world. One of its important and first applications in mechanics, especially to linear models of viscoelasticity, is due to Prof. Michele Caputo. In 1967, in his paper “*Linear Models of Dissipation whose Q is almost Frequency Independent – II*”, he introduced an operator for differentiation of arbitrary (fractional) order of the form, today referred to as the “Caputo derivative” (see eq. (5), p. 530) and used it for finding the analytical expression for a linear dissipative mechanism whose Q is almost frequency independent over large frequency ranges.

Prof. Caputo is a Honorary Member of Editorial Board of our journal. The year 2007 marked both his 80th personal anniversary, as well as *the 40th anniversary of this already famous paper*, and of the “Caputo derivative”. On this occasion, in vol. 10 (2007), and especially No 3, we have invited several survey and contributed papers close to the subject of the Caputo paper’1967 and continuing its applications’ trends. We find it now most interesting and useful for our audience, to reproduce the paper in this issue.

* *Special thanks* are due, for permission to reprint this article, to: Blackwell Publishing Ltd, Publisher of “Geophysical Journal International” (GJI), as a heir to “Geophysical Journal Royal Astronomical Society”, 1967. In its original variant, the paper appeared in: *Geophys. J. R. Astr. Soc.*, vol. **13**, Issue 5, November 1967, pp. 529-539. Now, it can be found and ordered at GJI contents: <http://www.blackwell-synergy.com/toc/gji/13/5>.

ON BEHALF OF THE EDITORIAL BOARD OF “FCAA”, Virginia Kiryakova