

# On a method of solving mixed-type FDEs

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## Abstract

The absorber theories of Wheeler-Feynman [1, 2] and others [3] have logical defects, pointed out long ago [4] but never addressed by proponents of the theory. Also, a key motivation of the Wheeler-Feynman theory no longer applies: the problem of runaways with radiation damping has been resolved differently. Runaways arise due to the mathematically incorrect conversion of functional differential equations (FDEs) of electrodynamics to ordinary differential equations, [5] and, conversely, runaways may be controlled by reverting to FDEs [6]. Nonetheless, absorber theories brought to light the important possibility that small amounts of advanced radiation may exist, as my absorber theory explicitly predicted. [4] If advanced radiation does exist, the equations of (classical) electrodynamics would be mixed-type FDEs. A method of solving such mixed-type FDEs is required to design proper experiments to detect advanced radiation. [7, 8]

Subsequently, mixed-type FDEs were proposed [9] as a general model for physics, independently of any absorber theory (including mine). This new, direct-action model corresponds to *starting* (in field-theoretic terms) with a mixture of the form  $(1 - c_a)F_{ret} + c_a F_{adv}$ , with  $c_a \approx 0$  (estimated to be  $10^{-12}$ ). This “tilt in the arrow of time” is not a hypothesis, since mixed-type FDEs *are* the most general form compatible with known physics. Instead of putting  $c_a = 0$  on some metaphysical “principle of causality”, one should decide it through physics. This requires the non-causal theory ( $c_a \neq 0$ ) to be compared with the causal theory, against observations. Mundane observation, however, repeatedly shows that future is not *entirely* determined by the past. From the qualitative theory of mixed-type FDEs, this favours the case  $c_a \neq 0$ . [9, 10] Further, for small  $c_a$ , the same qualitative theory allows one to infer a microphysical structure of time, corresponding to a quantum logic.[11] That is, (classical) mixed-type electrodynamics provides a simple model to explain the most puzzling aspect of quantum mechanics, namely the interference of probabilities (or the non-existence of a joint probability distribution for canonically conjugate variables).

For quantitative experimental tests (and to observationally fix the value of  $c_a$ ), we need a general technique to solve mixed-type FDEs. This paper explains such a technique for the 1 and 2 body problems of mixed-type electrodynamics (as distinct from the 2-body problem of retarded electrodynamics for which a technique is already available [12]).

## References

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