Linear FDEs in the frame of Generalized ODEs: a justification for using Kurzweil equations

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In [5] and [4], it was proved that retarded functional differential equations (we write FDEs for short) and impulsive FDEs can be related to generalized ODEs and several nice applications coming from this relation appear. See, for instance, [1], [3] and [2].

Our aim here is to we establish a relation between linear FDEs of the type

$$\begin{cases} \dot{y} = \mathcal{L}(y_t, t), \\ y_{t_0} = \varphi, \end{cases} \tag{1}$$

where $\mathcal{L}$ is a linear bounded operator and φ is a continuous function, and linear generalized ODEs of the form

$$\frac{dx}{d\tau} = D[A(t)x], \qquad x(t_0) = \widetilde{x}. \tag{2}$$

This relation is very interesting and it leads us to important applications.

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References

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