

Application of a SubIval Numerical Solver for Fractional Circuits

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Abstract : The paper discusses the subinterval-based numerical method for fractional derivative computations. It is now referred to by its acronym – SubIval. The basis of the method is briefly recalled. The ability of the method to be applied in time stepping solvers is discussed. The possibility of implementing a time step size adaptive solver is also mentioned. The solver is tested on a transient circuit example. In order to display the accuracy of the solver – the results have been compared with those obtained by means of a semi-analytical method called gcdAlpha. The time step size adaptive solver applying SubIval has been proven to be very accurate as the results are very close to the referential solution. The solver is currently able to solve FDE (fractional differential equations) with various derivative orders for each equation and any type of source time functions.

Keywords : numerical method, SubIval, fractional calculus, numerical solver, circuit analysis

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