Magnus integrators for linear and quasilinear delay differential equations

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Abstract

A procedure to numerically integrate non-autonomous linear delay differential equations is presented. It is based on the use of an spectral discretization of the delayed part to transform the original problem into a matrix linear ordinary differential equation which is subsequently solved with numerical integrators obtained from the Magnus expansion. The algorithm can be used in the periodic case to get both accurate approximations of the characteristic multipliers and the solution itself. In addition, it can be extended to deal with certain quasilinear delay equations.

Keywords: Non-autonomous linear delay differential equations, Magnus integrators, characteristic multipliers, quasilinear problems

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