Runge–Kutta convolution quadrature methods for linear

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Abstract

Runge–Kutta based convolution quadrature methods for abstract,
well posed, linear, and homogeneous Volterra equations, non necessarily of parabolic type, are developed. A general representation of the
numerical solution in terms of the continuous one is given. The error
and stability analysis is based on this representation, which also shows
that the numerical solution inherits some interesting qualitative properties, such as positivity, of the exact solution. Numerical illustrations
are provided.