

EXPONENTIALLY CONVERGENT PARALLEL DISCRETIZATION  
METHOD FOR THE FIRST ORDER EVOLUTION EQUATION

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*Abstract*

We propose a new discretization of an initial value problem for differential equations of the first order in a Banach space with a strongly P-positive operator coefficient. Using the strong positiveness we represent the solution as a Dunford-Cauchy integral along a parabola in the right half of the complex plane, then transform it into real integrals over  $(-\infty, \infty)$  and finally apply an exponentially convergent Sinc quadrature formula to this integral. The integrand values are the solutions of a finite set of elliptic problems with complex coefficients, which are independent and may be solved in parallel.

*Key words and phrases:* evolution equations, unbounded operator coefficients, strongly P-positive operators, quadrature rule.

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