

**Tornberg, Anna-Karin; Engquist, Björn**

**Regularization techniques for numerical approximation of PDEs with singularities.** (English)

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Summary: The rate of convergence for numerical methods approximating differential equations are often drastically reduced from lack of regularity in the solution. Typical examples are problems with singular source terms or discontinuous material coefficients. We shall discuss the technique of local regularization for handling these problems. New numerical methods are presented and analyzed and numerical examples are given. Some serious deficiencies in existing regularization methods are also pointed out.

**MSC:**

- 65L10 Numerical solution of boundary value problems involving ordinary differential equations
- 65L12 Finite difference and finite volume methods for ordinary differential equations
- 65M06 Finite difference methods for initial value and initial-boundary value problems involving PDEs
- 65L20 Stability and convergence of numerical methods for ordinary differential equations
- 34B05 Linear boundary value problems for ordinary differential equations
- 35L45 Initial value problems for first-order hyperbolic systems
- 65M12 Stability and convergence of numerical methods for initial value and initial-boundary value problems involving PDEs
- 35R05 PDEs with low regular coefficients and/or low regular data

Cited in **1** Review  
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**Keywords:**

discontinuous coefficients; singular source terms; local regularization; moment conditions; numerical examples

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