

Numerical Analysis of Hyperbolic Transmission Problem on Disjoint Intervals

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In this paper we investigate initial boundary value problems for one dimensional hyperbolic equations in disjoint domains. As a model example we take an area consisting of two non-adjacent intervals. In each interval an Robin's initial-boundary value problem is given. The interaction between their solutions is described using nonlocal integral conjugation conditions Robin-Dirichlet type on the boundaries of the observed subareas. For the model problem the existence and uniqueness of its weak solution in appropriate Sobolev-like space is proved. A finite difference scheme approximating this problem is proposed and analyzed. An estimate of the convergence rate, compatible with the smoothness of the input data is obtained.

References

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