Numerical Solution for the Source Identification Telegraph Problem with Neumann Condition

Allaberen Ashyralyev[1,2,3], Haitham Al-Hazaimeh[1]

[1] *Department of Mathematics, Near East University, Nicosia, Mersin 10, Turkey.*

allaberen.ashyralyev@neu.edu.tr

mathmatichhh@gmail.com

[2] *Peoples Friendship University of Russia (RUDN University), 6 Miklukho-Maklaya St,Moscow 117198, Russian Federation.*

[3] *Institute of Mathematics and Mathematical Modeling, 050010, Almaty,Kazakhstan.*

Abstract: The source identification problem for the telegraph equation is studied. We propose The first order of accuracy absolute stable difference scheme for the numerical solution of the one dimensional identification problem for the telegraph equation with the Neumann condition . Computational efficiency of the method is confirmed through example whose results are in good agreement with theory. The obtained numerical results have been compared with the exact solution to verify the accurate nature of our method.

Keywords: Source identification problem, telegraph equation, difference schemes.

2010 Mathematics Subject Classification: 35J25, 47E05, 34B27.

References

[1] C. Ashyralyyev, High order approximation of the inverse elliptic problem with Dirichlet-Neumann conditions, Filomat, vol. 28, no 5, 947–962, 2014.

[2] A. Ashyralyev, A. Al-Hammouri, A numerical algorithm for a source identification problem for the elliptic-telegraph equation, AIP Conference Proceedings, vol. 2183, no 1, 070008, 2019.

[3] M. B. A. Mansour, Existence of traveling wave solutions in a hyperbolic-elliptic system of equations, Commun. Math. Sci., vol. 4, no 4, 731-739, 2006.

[4] A. Ashyralyev, F. Özger, The hyperbolic-elliptic equation with the nonlocal condition, Mathematical Methods in the Applied Sciences, vol. 37, no 4, 524-545, 2013.