Numerical Solution for the Second Order of Accuracy Difference Scheme for the Source Identification Elliptic-Telegraph Problem

Allaberen Ashyralyev[1,2,3], Ahmad Al-Hammouri[1]

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

allaberen.ashyralyev@neu.edu.tr

[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.*

alhammouri.math@gmail.com

Abstract: Identification problems take an important place in applied sciences and engineering applications and have been studied by many authors (see, e.g., [1]-[4] and the references given therein).
In the present paper, source identification problem for the elliptic-telegraph equation is investigated. The second order of accuracy absolute stable difference scheme for the numerical solution of the one dimensional identification problem for the elliptic-telegraph equation with the Dirichlet condition is presented. Some numerical results are provided.

Keywords: Source identification problem, elliptic-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.