

SEMINAR

Grupo de Análise Funcional e Aplicações Functional Analysis and Applications Group

Diffraction problems for two-dimensional lattice waves

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Abstract

Motivated by applications of recent interest related to propagation problems in the left-handed 2D inductor-capacitor metamaterial and standard 2D inductor-capacitor lattice, we investigate diffraction problems for two-dimensional lattice waves. In particular, we study exterior Dirichlet problems for the two-dimensional discrete Helmholtz equation with the real wavenumber $k \in (0, 2\sqrt{2}) \setminus \{2\}$. The investigation is carried out without passing to the complex wavenumber. Similar to the continuum theory, we use the notion of radiating solution. Then, the unique solvability result and Green's representation formula are obtained with the help of difference potentials. Finally, we propose a method for numerical calculation. The efficiency of our approach is demonstrated on examples related to the propagation problems in the left-handed 2D inductor-capacitor metamaterials.

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