

Anastasiia Legatiuk: "Discrete potential and function theories on a rectangular lattice and their applications"

Abstract

In this talk, we will present an extension of the discrete potential theory and discrete function theory to rectangular lattices. As usual in the discrete theories, construction of discrete operators is strongly influenced by a definition of discrete geometric setting. For providing consistent constructions, a detailed discussion on the discrete geometric setting will be presented in the beginning of the talk. After that, the discrete fundamental solution of the discrete Laplace operator on a rectangular lattice and its numerical analysis will be discussed. By using the discrete fundamental solution of the discrete Laplace operator on a rectangular lattice, the discrete potential theory is then constructed for interior and exterior settings. Several discrete interior and exterior boundary value problems are then solved. Moreover, discrete transmission problems are introduced and several numerical examples of these problems are discussed. Finally, a discrete fundamental solution of the discrete Cauchy-Riemann operator on a rectangular lattice is constructed, and basics of the discrete function theory on a rectangular lattice will be provided.