

Image Transform Based on Integral Equation-Wavelet Approach

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Abstract : Harmonic model is a very important approximation for the image transform. The harmonic model converts an image into arbitrary shape; however, this mode cannot be described by any fixed functions in mathematics. In fact, it is represented by partial differential equation (PDE) with boundary conditions. Therefore, to develop an efficient method to solve such a PDE is extremely significant in the image transform. In this paper, a novel Integral Equation-Wavelet based method is presented, which consists of three steps: (1) The partial differential equation is converted into boundary integral equation and representation by an indirect method. (2) The boundary integral equation and representation are changed to plane integral equation and representation by boundary measure formula. (3) The plane integral equation and representation are then solved by a method we call wavelet collocation. Our approach has two main advantages, the shape of an image is arbitrary and the program code is independent of the boundary. The performance of our method is evaluated by numerical experiments.

Keywords : harmonic model, partial differential equation (PDE), integral equation, integral representation, boundary measure formula, wavelet collocation

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