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论文

构造径向基函数的一般方法及其在图象处理中的应用

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摘要:

关键词:

Theory of Constructing Radial Basis Functions and Its Applications in Image Processing

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Abstract:

general method for constructing radial basis function (RBF) and a mul-tiscale approximate formula of an arbitrary function in L2(Rn) based on RBFexpansion are proposed. Two radial basis functions are introduced as examples.They are not only infinitely differentiable but also locally supported. As appli-cations in image processing, they are used for both edge detection and noisesreduction respectively. The computational complexity of the corresponding algo-rithms is O(N2) for N × N images, a linear order of the piXel number, which issignificantly better than that of O(N2 log N) using the preconditioned conjugategradient iterative algorithm for handling leaJst squares problem. The denoisingalgorithm given here can be implemented using less storage and computation thanthe orthogonal least squares learning algorithm. The test results show that theRBF with local support is suited to design fast algorithms in image processing.

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