

Haar, Wavelets System, Multi-Resolutions and the special atom space in Higher Dimensions and its Analytic Characterizations

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Abstract

In this presentation, we will explore the special atom spaces introduced by De Souza in 1980 in his PhD thesis. The impetus of this exploration is to extend to higher dimension the definition originally proposed by De Souza. **A byproduct of this endeavor will be the definition of the Haar wavelets and wavelets system in higher dimensions.** Even though the Haar System in higher dimension has been discussed by numerous authors in the literature, the definitions proposed do not always seem natural extension of the one-dimension case and often are unnecessarily cumbersome and difficult to follow. The special atoms spaces are closely connected with several knowns' spaces in the literature, like Lipschitz, Bergman, Zygmund, Lorentz spaces etc. these connections were possible because of their analytic characterization, duality, interpolation etc. Also, the special atoms is related to the 1-dimension Haar function. **We also have some applications of Haar-Wavelets and a Multi-resolution analysis in 2-dimensions.** Some important historical facts that not too many people know.

About the speaker

Geraldo Soares de Souza, PhD from The University of Albany, Albany - New York in the area of Harmonic Analysis. He is currently a **Professor Emeritus** of Mathematics at Auburn University in Auburn, Alabama. He has had several Master and PhD students and publications in his area of expertise. For over 25 years, he has led a series of conferences in Harmonic Analysis and Related Areas at Auburn University sponsored by NSF. He and his colleagues have led several international projects in Africa, South America, Central America, etc. He and some colleagues have been originally involved in a NSF and other agencies project to create a more robust infrastructure to support mathematics education in Africa.