

Dilluns 13 de maig del 2013, 15:00h

Aula T2 (UB).

Group representations and continuous wavelet theory.

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ABSTRACT:

The concept of wavelet analysis emerged about 30 years ago and exploded into a wide range of applications that are now felt in the day to day lives of most people. Digital storage of music and medical imaging are just two examples of the influence of wavelet analysis in the twenty first century. There are many different ways in which one can think about wavelets and develop a theory. In this talk, we will set the discrete theory and efficient computational techniques necessary for most applications aside and concentrate on the underlying continuous wavelet transform and reconstruction formula. After reviewing the now classical case of affine transformations of \mathbb{R} , we will discuss how generalizations and analogs of the classical case can be discovered in higher dimensions. We will explore how the theory of unitary representations of locally compact groups provides a fruitful way of constructing novel continuous wavelet theories and we will provide details of a couple of concrete examples.