A Short-time Fourier transform for quaternionic signals

Paula Cerejeiras

Department of Mathematics, University of Aveiro, PORTUGAL

pceres@ua.pt

The existent quaternion Fourier transform is useful for the representation of signals and transforms a quaternionic 2D signal into a quaternion-valued frequency domain signal. Since uncertainty principles are closely connected to the representations of the kernel of the Fourier transform under consideration, we construct a suitable representation for the kernel of the proposed short-time Fourier transform which in turn provides suitable Gabor systems. However, the non-commutativity of the quaternions poses a problem for an effective construction of such a kernel. In this talk we propose a possible representation via *carrier operators* and the quaternionic Zak transform. The Zak transform enables us to establish the quaternionic frame associated with the discrete version of the kernel of the short-time quaternionic Fourier transform, and to obtain the Balian-Low theorem for this setting.

....

Joint work with **Yingxiong Fu** and **Uwe Kähler**.