



KATHOLISCHE UNIVERSITÄT
EICHSTÄTT-INGOLSTADT

Mathematisches Kolloquium

Construction of dual Gabor frames

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Mittwoch, 20. November 2019, KG I/Bau A 103, 17.00 Uhr s.t.
Um 16.30 Uhr werden im selben Raum Kaffee und Tee serviert.

MATHEMATISCH-GEOGRAPHISCHE FAKULTÄT

Abstract:

In time-frequency analysis of $L^2(\mathbb{R})$ Gabor systems $\{e^{2imbx}g(xak) : m, k \in \mathbb{Z}\}$, where $a > 0$ is a translation parameter, $b > 0$ a modulation parameter, and g a square-integrable window function, play an important role. For "nice" window functions, however, the Gabor system cannot form an orthonormal basis (ONB) for any values of a and b , and one therefore resorts to so-called dual Gabor frames which are by now considered to be the correct (redundant) generalization of ONBs.

For redundant Gabor frames, it is often difficult to calculate or even approximate the canonical dual Gabor window since the process involves inverting the frame operator. The classical painless non-orthogonal construction of Daubechies et al. is a simple and effective approach, but it is usually only applicable for Gabor systems with small redundancy ab . In this talk we consider explicit, yet general, constructions of non-canonical dual Gabor dual windows with desirable properties such as smoothness and small redundancy. The construction framework is based on the fiberization techniques of Ron and Shen and the Neville elimination as known from linear algebra. The properties of the dual windows will be controlled by a carefully chosen parametrization of all compactly supported dual windows.

The talk is based on joint work with Kamilla Haahr Nielsen.