

SAMPLING IN SPACES OF VARIABLE BANDWIDTH CONSTRUCTED WITH WILSON BASES

BEATRICE ANDREOLLI

ABSTRACT. We introduce a new space of variable bandwidth $PWil_b^2$, defined as

$$PWil_b^2 = \left\{ f = \sum_{k \in \mathbb{Z}} \sum_{l=0}^{b(k)} c_{k,l} \psi_{k,l}, c \in \ell^2(\mathbb{Z} \times \mathbb{N}), \text{ with } b(k) \leq B \quad \forall k \in \mathbb{Z} \right\}.$$

This is a subspace of $L^2(\mathbb{R})$ which is based on the truncation of Wilson expansions $\{\psi_{k,l}\}_{k \in \mathbb{Z}, l=0, \dots, b(k)}$. We motivate why it could be useful in different areas of science and we study the problem of finding necessary density conditions and sufficient conditions for sampling for this space of variable bandwidth. The necessary density condition for sampling follows upon elaborating the conditions in [1]. The constructive method to show sufficient conditions for sampling is based on the so called adaptive weights method designed by Gröchenig in [2].

The talk is based on joint work with Karlheinz Gröchenig.

REFERENCES

- [1] H. Führ, K. Gröchenig, A. Haimi, A. Klotz, and J. L. Romero, *Density of sampling and interpolation in reproducing kernel Hilbert spaces*, Journal of the London Mathematical Society **96** (2017).
- [2] K. Gröchenig, *Reconstruction Algorithms in Irregular Sampling*, Mathematics of Computation **59** (1992).

NUHAG, FACULTY OF MATHEMATICS, UNIVERSITY OF VIENNA, OSKAR-MORGENSTERN-PLATZ
1, 1090 VIENNA, AUSTRIA
Email address: `beatrice.andreolli@univie.ac.at`