COMPLETE INTERPOLATING SEQUENCES IN SHIFT-INVARIANT SPACES AND IN SMALL FOCK-TYPE SPACES

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Abstract. In 2015, in a joint paper with A. Dumont, K. Kellay and A. Hartmann, we found a description of complete interpolating sequences in the Fock-type space with the weight function $\exp(-\log^2|z|)$. The criterion had a simple geometric form (reminiscent of a well-known Avdonin condition in the theory of exponential bases) in terms of the average deviations of the sequence from the integer lattice in the logarithmic scale. Unexpectedly, this result turned out to be useful in the study of so-called translation-invariant spaces. Given a "window" function g on $\mathbb{R}$ with a sufficiently fast decay at infinity, one considers the shift invariant space $V^2(g)$ – the subspace of $L^2(\mathbb{R})$ generated by all integer shifts of g. Shift-invariant spaces are an important tool in time-frequency analysis.

Reducing the problem to an equivalent one in the small Fock type space made it possible to obtain a description of complete interpolating sequences for spaces generated by shifts of the Gaussian or a secant type function. This is the first result of this kind for this class of spaces. It is also shown that any sampling sequence contains a complete interpolating sequence, and any interpolating sequence can be complemented to a complete interpolating sequence, thus, giving a new proof of the well-known results of K. Gröchenig, J.L. Romero, and J. Stöckler (2018) on the description of sampling and interpolating sequences in terms of upper and lower densities. Also, as an application, results on irregular sampling for Gabor frames consisting of time-frequency shifts of a secant type function are obtained.

The talk is based on joint works with Yu.S. Belov and K. Gröchenig.