

Small test function and large distribution spaces, invariant under Fourier transformation

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We consider a family of function spaces, defined by estimates of $H^N f$, which include all Fourier invariant standard Gelfand-Shilov (FIGS) spaces. Here H is the harmonic oscillator. Such approach was done by Pilipović in the 80th, and therefore the function spaces are called Pilipović spaces. The smallest spaces are significantly smaller than the non-trivial FIGS-spaces, and family of corresponding distribution spaces contain spaces larger any FIGS distribution space. We consider:

- Characterizations in terms of Hermite expansions and Bargmann transform.
- A "Paley-Wiener related" property", linking Grchenig's \mathcal{S}_C space to the family
- Estimates like

$$\sigma_j(T) \lesssim e^{-c \cdot j^{\frac{1}{2ds}}}$$

for singular values of operators with kernels in the family.

Parts of the talk is based on collaborations with Y. Chen and M. Signahl.