Sequence space representations for translation-modulation invariant function and distribution spaces

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The representation of function and distribution spaces by sequence spaces is a central topic in functional analysis that goes back to the pioneering work of Valdivia and Vogt and is closely connected to the isomorphic classification of such spaces. In particular, there has been a considerable interest in the sequence space representations of the spaces appearing in Schwartz's classical distribution theory. In this talk, we demonstrate how one may unify and generalize many of these known representations by providing sequence representations for test function and distribution spaces defined via a broad class of translation-modulation invariant Banach spaces. Our proof is based on the Gabor frame characterization of the aforementioned spaces and the use of the Pełczynski decomposition method. As an application of our results, we present the isomorphic classification of the spaces $\mathcal{D}_{L^{p_1}\widehat{\otimes}_\pi L^{p_2}}$, $1 < p_1, p_2 < \infty$, thereby showing that these spaces are genuinely new and distinct.