Eigenexpansions of ultradifferentiable functions and ultradistributions in $\mathbb{R}^n$

ĐORĐE VUČKOVIĆ
Ghent University, Ghent, Belgium
dordev@cage.ugent.be

In this talk we will show a characterization of $\mathcal{S}^{\{M_p\}}_{\{M_p\}}(\mathbb{R}^n)$ and $\mathcal{S}^{(M_p)}_{(M_p)}(\mathbb{R}^n)$, the general Gelfand-Shilov spaces of ultradifferentiable functions of Roumieu and Beurling type, in terms of decay estimates for the Fourier coefficients of their elements with respect to eigenfunction expansions associated to normal globally elliptic differential operators of Shubin type. Moreover, we will show that the eigenfunctions of such operators are absolute Schauder bases for these spaces of ultradifferentiable functions. Our characterization extends earlier results by Gramchev et al. (Proc. Amer. Math. Soc. **139** (2011), 4361–4368.) for Gevrey weight sequences. It also generalizes to $\mathbb{R}^n$ recent results by Dasgupta and Ruzhansky, which were obtained in the setting of compact manifolds.

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