FACTORIZATION OF QUASIANALYTIC VECTORS

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In 1978 [1], Dixmier and Malliavin addressed the following problem: Let E be a Banach space and let (π, E) be a representation of a Lie group G on E. This representation induces a continuous action Π of the algebra $C_c^\infty(G)$ on E given by

$$\Pi(f)e = \int_G f(g)\pi(g)e\mathrm{d}g, \qquad f \in \mathcal{D}(G), e \in E,$$

and it restricts to a continuous action on the space of smooth vectors E^∞. Dixmier and Malliavin proved the following beautiful factorization result

$$E^\infty = \operatorname{span}(\Pi(\mathcal{D}(G))E^\infty).$$

Recently, a similar factorization result was shown for analytic vectors [2, 3].

In this talk we will generalize these results for the case $G = (\mathbb{R}^d, +)$ in the following way: We consider a representation (π, E) of $(\mathbb{R}^d, +)$ on a quasi-complete locally convex space E, introduce the notion of a *quasianalytic* vector (w.r.t. a general Denjoy-Carleman class) and show a Dixmier-Malliavin type result for the space of quasianalytic vectors. As an application, we present factorization results for various weighted convolution algebras of quasianalytic functions.

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References

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[3] C. Lienau, *Analytic representation theory of* $(\mathbb{R}; +)$, J. Funct. Anal. **257** (2009), 3293–3308.