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Absolutely Representing Systems of Exponentials in the Spaces of Infinitely-Differentiable Functions and Extendability in the Sense of Whitney

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Abstract: Let Q be a compactum in~\mathbb{R}^p, p\geqslant1, such that int Q\neq\varnothing and Q=\overline{ int Q}. Denote by C^\infty[Q] the space of functions from C^\infty(int Q) uniformly continuous in int Q together with all their partial derivatives. The conditions of the existence of absolutely representing systems of exponentials with purely imaginary exponents in the space C^\infty[Q] and some of its subspaces of Denjoy--Carleman type are investigated. It is also proved under rather general assumptions that there is no such absolutely representing systems in the space E(G)=\operatornamewithlimits{proj} \limits {\overleftarrow {Q\in \mathcal{F}_G}}E[Q] where G is an arbitrary open set in~\mathbb{R}^p, E[Q] is C^\infty[Q] or its subspace mentioned above and \mathcal{F}_G is the totality of all non-empty compact sets \mathcal{K} in G with the property \mathcal{K}= \overline{ int \mathcal{K}}.

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