

Dense nuclear Fréchet ideals in C^* -algebras

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We show that a C^* -algebra B contains a dense left or right Fréchet ideal A , with A a nuclear locally convex space, if and only if the primitive ideal space $\text{Prim}(B)$ of B is discrete and countable, and B/I is finite dimensional for each $I \in \text{Prim}(B)$. Here $\{\|\cdot\|_n\}_{n=0}^\infty$ denotes a family of increasing norms topologizing A . We show the forward implication holds for a general Banach algebra B , if the ideal is assumed two-sided. For C^* -algebras, we construct dense nuclear ideals by defining a set of matrix-valued Schwartz functions on the countable discrete space $\text{Prim}(B)$.

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