Restriction spaces of A^∞

Dietmar Vogt
Bergische Universität Wuppertal

Abstract

Let A^∞ be the space of 2π-periodic C^∞-functions on $\mathbb{R}$ with vanishing negative Fourier coefficients or, equivalently, the space of holomorphic functions on the unit disc with C^∞-boundary values. It is shown that for certain totally disconnected Carleson sets E the restriction space $A_\infty(E) := A^\infty|_E$ has a basis, so disproving a claim of S. R. Patel. Among the examples there are the classical Cantor set and sets like $\{2^{-n} : n = 1, 2, \dots\} \cup \{0\}$. To prove our result we show, using a result of Alexander, Taylor and Williams, that in our cases we have $A_\infty(E) = C_\infty(E)$ where $C_\infty(E) := C^\infty(\mathbb{R})|_E$. Then we analyze carefully the structure of the restriction spaces $C_\infty(E)$ making use of analytical tools and of the structure theory of nuclear Fréchet spaces.