ANALYSIS SEMINAR

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Some new function spaces

by

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ABSTRACT

Recently, we introduced some new function spaces, i.e. B_σ-function spaces denoted by $B_\sigma(E)(\mathbb{R}^n)$ and $\dot{B}_\sigma(E)(\mathbb{R}^n)$. These function spaces are defined as follows. For $\sigma \in [0,\infty)$, let $B_\sigma(E)(\mathbb{R}^n)$ and $\dot{B}_\sigma(E)(\mathbb{R}^n)$ be the sets of all functions f on $\mathbb{R}^n$ such that $\|f\|_{B_\sigma(E)} < \infty$ and $\|f\|_{\dot{B}_\sigma(E)} < \infty$, respectively, where $\|f\|_{B_\sigma(E)} = \sup_{r\geq 1} 1/r^\sigma \|f\|_{E(Q_r)}$ *and* $\|f\|_{\dot{B}_\sigma(E)} = \sup_{r>0} 1/r^\sigma \|f\|_{E(Q_r)}$. Here, for each $r > 0$, $Q_r = \{y = (y_1, y_2, \cdots, y_n) \in \mathbb{R}^n : \max_{1\leq i\leq n} |y_i| < r\}$ or $Q_r = \{y \in \mathbb{R}^n : |y| < r\}$, and $E(Q_r)$ is a function space on Q_r with semi norm $\|\cdot\|_{E(Q_r)}$. For example, $E = L^p$, Lip_α, BMO, etc.

If $E = L^p$ and $\sigma = n/p$, then $B_\sigma(L^p)(\mathbb{R}^n) = B^p(\mathbb{R}^n)$ which introduced by Beurling (1964) together with its predual $A^p(\mathbb{R}^n)$, so-called the Beurling algebra.

Using the B_σ-function spaces, we can unify a series of results on the boundedness of operators on several classical function spaces.

The talk is based on a joint work with Y. Komori-Furuya (Tokai U), E. Nakai (Ibaraki U) and Y. Sawano (Kyoto U).

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