1038-42-171 **Alberto Torchinsky*** (torchins@indiana.edu), Math Department, Rawles Hall 305, Bloomington, IN 47405. *Spaces between H^1 and L^1.*

It is a matter of interest to determine the relationship between the Hardy space $H^1(R^n)$ and the space of integrable functions $L^1(R^n)$, and to gain a better understanding of the gap that separates them.

This talk is devoted to the spaces X_s introduced by Sweezy. They form a nested family that starts at $H^1 = X_1$ and approaches $X_\infty = L^1_0$, the subspace of L^1 functions with vanishing integral.

Furthermore, for $f \in X_s$,

$$K(t, f; H^1, L^1) \leq \min(t, t^{1/s'}) \, \|f\|_{X_s} \, .$$

Thus, interpolation between H^1 and L^1 is possible, and one notes that X_s is continuously embedded in the Hardy-Lorentz space $H^{1,r}$, i.e., the space of distributions with non-tangential maximal function in the Lorentz space $L^{1,r}$, for $1 < s < r \leq \infty$.

As for Calderón-Zygmund singular integral operators, they map X_s into $L^{1,r}$ for $1 < s < r \leq \infty$.

We will also discuss the closely related family of X^s spaces, $0 < s \leq \infty$, that increases towards L^1, and show how X_s and X^s atoms can be used to build other spaces, including analogues of local H^1 spaces, that lie between H^1 and L^1. (Received February 07, 2008)