1054-42-181 **Izabella Laba\*** (`ilaba@math.ubc.ca`), Department of Mathematics, UBC, Vancouver, B.C. V6T1Z2, Canada. *Maximal operators and differentiation theorems in sparse sets.*

We study maximal averages associated with singular measures on $\mathbf{R}$. Our main result is a construction of singular Cantor-type measures in one dimension for which the corresponding maximal operator are bounded on $L^p$ for all $p > 1$. As a consequence, we answer a question of Aversa and Preiss on density and differentiation theorems in one dimension. Our proof combines probabilistic techniques with the methods developed in multidimensional harmonic analysis. (Joint work with Malabika Pramanik.) (Received September 13, 2009)