1084-28-45 **Joseph Max Rosenblatt*** (`rosnblttt@illinois.edu`), Department of Mathematics, University of Illinois, Urbana, IL 61801. *Multivariable Differentiation in Euclidean Spaces.* Preliminary report.

Suppose we consider all rectangles $R = [0, l_1] \times \cdots \times [0, l_d]$ where $0 < l_1, \ldots, l_d \leq 1$. Let f_R^* be the maximal function corresponding to the Lebesgue derivatives $f_R = \frac{1}{|R|} 1_R * f$. It is a classical fact that this maximal function is strong (p, p) for $1 < p \leq \infty$ but is not weak $(1, 1)$. Also, the biggest Orlicz class that it is well behaved on is $L \log^{d-1} L$. It is also a classical fact that if $f_R^{\#}$ is the maximal function over rectangles that are restricted to having the lengths l_k all equal, then there is a weak $(1, 1)$ inequality. We consider various other ways to restrict the set of lengths $(l_1, \ldots, l_d)$ being used. We seek to characterize when the associated restricted maximal function satisfies a weak $(1, 1)$ inequality. If this fails to be the case, we seek to characterize the optimal Orlicz class on which the restricted maximal function is well-behaved. (Received August 13, 2012)