Meeting: 1003, Atlanta, Georgia, AMS CP 1, AMS Contributed Paper Session

1003-26-550 **J. Marshall Ash*** (mash@math.depaul.edu), Department of Mathematics, DePaul University, Chicago, IL 60614. *A non-differentiable function that is L^p differentiable.*

A real-valued function f of a real variable is *differentiable at* x if there is a real number $f'(x)$ such that

$$|f(x+h) - f(x) - f'(x)h| = o(h) \text{ as } h \to 0.$$

Fix $p \in (0, \infty)$. A function is *differentiable in the* L^p *sense at* x if there is a real number $f'_p(x)$ such that

$$\left\| f(x+h) - f(x) - f'_p(x)h \right\|_p = o(h) \text{ as } h \to 0,$$

where $\|g(h)\|_p = \left(\frac{1}{h}\int_0^h |g(t)|^p\, dt\right)^{1/p}$. We show that there is a set E of positive Lebesgue measure and a function nowhere differentiable on E which is differentiable in the L^p sense for every positive p at each point of E.

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