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J Michael Wilson* (wilson@cems.uvm.edu), Department of Mathematics, University of Vermont, Burlington, VT 05405. *The intrinsic square function.*

We define a natural generalization of the Lusin square function, which we call the intrinsic square function (ISF). The ISF pointwise dominates many of the “classical” square functions (including the Lusin area function), but is essentially no bigger and no harder to handle than a real-variable square function defined via a smooth, compactly supported kernel ψ . The proof of these facts relies on a surprising (and, we think, little-known) “self-improving” property of certain functions satisfying mild decay and smoothness conditions. The ISF lets us prove an old conjecture of R. Fefferman and E. M. Stein. We also show that the ISF defines a bounded operator on $L^p(w)$ when w is an A_p weight ($1 < p < \infty$).

If time permits we will describe some other applications of the ISF as well. (Received July 20, 2006)