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Noel Ramsey DeJarnette*, Department of Mathematics, University of Illinois, 1409 West Green Street, Urbana, IL 61801. *Orlicz spaces, Lorentz spaces, and self-improving Orlicz-Poincaré inequalities: Connections and consequences.*

The theory of Lorentz spaces and Orlicz-Sobolev spaces hint that the algebraic scale of exponents is too coarse to capture the critical transition between changes in fundamental properties in many contexts. In this talk, we introduce the Young function used to define the Lorentz-Zygmund class and explore the major appearances of a condition on the logarithmic scale, optimal embedding and the association of Orlicz gauges to Lorentz spaces, and show that this condition also appears in the context of self-improving Orlicz-Poincaré inequalities. We provide an example of a planar set that shows the logarithmic scale is the correct "fineness" for self-improvement of Orlicz-Poincaré inequalities. (Received September 12, 2013)