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**Michael Penrod\*** (mxp053@shsu.edu). *Variable Lebesgue Spaces: A Comparison.*

The classical Lebesgue space  $L^p(\mathbb{R})$  is a well understood Banach space when  $1 \leq p \leq \infty$ . Many results come from this classical setting in which  $p$  is a fixed constant. However, when we replace this constant exponent  $p$  with a variable exponent function  $p(\cdot)$ , many well known definitions and results change, such as the norm, Holder's Inequality, and the Dominated convergence Theorem. In this presentation, we define the variable Lebesgue space  $L^{p(\cdot)}(\mathbb{R})$ . We then compare  $L^p(\mathbb{R})$  with  $L^{p(\cdot)}(\mathbb{R})$  by seeing what happens to these well-know theorems in the variable setting. We finish by considering an equality of conjugate exponent norms in the constant exponent setting, and determine whether this equality holds in the variable exponent setting. (Received September 16, 2019)