Mathematical Sciences

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Colloquium Series

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The University of Texas at El Paso

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Modular Uniform Convexity in Variable Exponent Spaces

Abstract

Variable-exponent spaces were first mentioned in a paper by Orlicz in 1931. In the late nineteenth century these spaces were brought into the center stage of mathematical research as they were realized to be the natural solution space for partial differential equations with non-standard growth. Similar considerations arise in the study of the hydrodynamic equations governing non-Newtonian fluids. These equations have non-standard growth, in particular, electrorheological fluids, i.e., fluids whose viscosity can be changed dramatically and in a few mili-seconds when exposed to a magnetic or an electric field. Electrorheological fluids are currently the object of intense research activity in both, theoretical and applied fields. Their applications include medicine, civil engineering and military science. Through these applications, then, there inexorably emerged the need for a deeper understanding of these generalized functional spaces with variable integrability. In this talk, we introduce a modular geometric property, known as the modular uniform convexity. Then we show that variable exponent spaces which fail to have good behavior with respect to the Luxemburg norm may have this property.

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