DENSITY OF CONTINUOUS FUNCTIONS AND RELATED QUESTIONS IN VARIABLE EXPONENT SOBOLEV SPACE

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Variable exponent Lebesgue and Sobolev spaces made their first appearance in the literature in 1931, but it is only over the last couple of years that they have been intensely studied by a large number of researchers (see e.g., [1, 4]). One reason for this increase in interest is that these spaces are now known to be connected to the analysis of variational problems featuring non-standard growth and coercivity conditions, which in turn have been applied e.g. modeling electrorheological fluids.

Some questions, like the boundedness of the maximal operator, are now quite well understood. Others, like necessary conditions on the variable exponent for the density of continuous functions in Sobolev space, are still far from resolved. In this poster I present a counter-example to the density of continuous functions and give several new sufficient conditions for their density [3]. I also explain how these results are related to studying the minimzer of the Dirichlet energy integral under minimal conditions on the exponent [2].

This work has been carried out in the Helsinki research group on variable exponent Lebesgue and Sobolev spaces. for more information including PDFs of our preprints please see http://www.math.helsinki.fi/analysis/varsobgroup/.

References

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[4] V. Kokilashvili and S. Samko: Maximal and fractional operators in weighted $L^{p(x)}$ spaces, *Rev. Mat. Iberoamericana* **20**(2) (2004), to appear.