

Characterization of Riesz and Bessel potentials on variable Lebesgue spaces

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Abstract. Riesz and Bessel potential spaces are studied within the framework of the Lebesgue spaces with variable exponent. It is shown that the spaces of these potentials can be characterized in terms of convergence of hypersingular integrals, if one assumes that the exponent satisfies natural regularity conditions. As a consequence of this characterization, we describe a relation between the spaces of Riesz or Bessel potentials and the variable Sobolev spaces.

1. Introduction

The Lebesgue spaces $L_{p(\cdot)}$ with variable exponent and the corresponding Sobolev spaces $W_{p(\cdot)}^m$ have been intensively investigated during the last years. We refer to the papers [16], [27], where the basics of such spaces were developed, to the papers [9], [23], where the denseness of nice functions

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