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CHARACTERIZATION OF SOBOLEV–SLOBODECKIJ SPACES USING CURVATURE ENERGIES

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Abstract: We give a new characterization of Sobolev–Slobodeckij spaces $W^{1+s,p}$ for $n/p < 1+s$, where n is the dimension of the domain. To achieve this we introduce a family of curvature energies inspired by the classical concept of integral Menger curvature. We prove that a function belongs to a Sobolev–Slobodeckij space if and only if it is in L^p and the appropriate energy is finite.

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