
Fractional maximal operators and fractional integrals on local Morrey-Lorentz spaces and some applications

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In this talk, firstly we obtain the necessary and sufficient conditions for the boundedness of the fractional maximal operator M_α in the local Morrey-Lorentz spaces $M_{p,q;\lambda}^{loc}(R^n)$. We use sharp rearrangement inequalities while proving our result. We apply this result to the Schrödinger operator $-\Delta + V$ on R^n , where the nonnegative potential V belongs to the reverse Hölder class $B_\infty(R^n)$. We give the local Morrey-Lorentz $M_{p,r;\lambda}^{loc}(R^n) \rightarrow M_{q,s;\lambda}^{loc}(R^n)$ estimates for the Schrödinger type operators $V^\gamma(-\Delta + V)^{-\beta}$ and $V^\gamma \nabla(-\Delta + V)^{-\beta}$.

Secondly, we find the necessary and sufficient conditions for the boundedness of the Riesz potential I_α in the local Morrey-Lorentz spaces $M_{p,q;\lambda}^{loc}(R^n)$. This result is applied to the boundedness of particular operators such as the fractional maximal operator, fractional Marcinkiewicz operator and fractional powers of some analytic semigroups on the local Morrey-Lorentz spaces $M_{p,q;\lambda}^{loc}(R^n)$.

Keywords: Local Morrey-Lorentz spaces, Riesz potential, Hardy operators, fractional maximal operator, Schrödinger operator.

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