THE DIRICHLET PROBLEM FOR NONLOCAL LÉVY-TYPE OPERATORS

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Abstract: We present the theory of the Dirichlet problem for nonlocal operators which are the generators of general pure-jump symmetric Lévy processes whose Lévy measures need not be absolutely continuous. We establish basic facts about the Sobolev spaces for such operators, in particular we prove the existence and uniqueness of weak solutions. We present strong and weak variants of maximum principle, and L^∞ bounds for solutions. We also discuss the related extension problem in $C^{1,1}$ domains.