A limiting obstacle problem for the inhomogeneous $p-$fractional Laplacian

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Abstract. In this work we study an inhomogeneous obstacle type problem involving the fractional $p-$Laplacian operator (cf. Korvenpää *et al* [3]). Firstly, we establish existence and uniform estimates for any family of solutions $\{u_p\}_{p\geq 2}$ which depend on the data of the problem and universal parameters. Finally, we analyze the asymptotic behavior of such a family as $p \to \infty$. At this point, we prove that $\lim\limits_{p\to\infty} u_p(x) = u_\infty(x)$ there exists (up to a subsequence), verifies a limiting obstacle type problem in the viscosity sense, and it is an $s-$Hölder continuous function (cf. da Silva & Rossi [1]).

References

[1] J.V. DA SILVA AND J.D. ROSSI - *The limit as $p \to \infty$ in free boundary problems with fractional p-Laplacians.* Trans. Amer. Math. Soc. 371 (2019), no. 4, 2739-2769.

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[3] J. KORVENPÄÄ, T. KUUSI AND G. PALATUCCI - *The obstacle problem for nonlinear integro-differential operators.* Calc. Var. Partial Differential Equations 55 (2016), no. 3, Art. 63, 29 pp.