

**THE SHARP EXPONENT IN THE STUDY OF THE
NONLOCAL HÉNON EQUATION IN \mathbb{R}^N . A LIOUVILLE
THEOREM AND AN EXISTENCE RESULT**

B. BARRIOS AND A. QUAAS

ABSTRACT. We consider the nonlocal Hénon equation

$$(-\Delta)^s u = |x|^\alpha u^p, \quad \mathbb{R}^N,$$

where $(-\Delta)^s$ is the fractional Laplacian operator with $0 < s < 1$, $-2s < \alpha$, $p > 1$ and $N > 2s$. We prove a nonexistence result for positive solutions in the optimal range of the nonlinearity, that is, when

$$1 < p < p_{\alpha,s}^* := \frac{N + 2\alpha + 2s}{N - 2s}.$$

Moreover, we prove that a bubble solution, that is a fast decay positive radially symmetric solutions, exists when $p = p_{\alpha,s}^*$.

B. BARRIOS

DEPARTAMENTO DE ANÁLISIS MATEMÁTICO, UNIVERSIDAD DE LA LAGUNA
C/. ASTROFÍSICO FRANCISCO SÁNCHEZ S/N, 38200 – LA LAGUNA, SPAIN
E-mail address: `bbarrios@ull.es`

A. QUAAS

DEPARTAMENTO DE MATEMÁTICA,
UNIVERSIDAD TÉCNICA FEDERICO SANTA MARÍA
CASILLA V-110, AVDA. ESPAÑA, 1680 – VALPARAÍSO, CHILE.
E-mail address: `alexander.quaas@usm.cl`