

**SYMMETRY RESULTS IN THE HALF SPACE FOR A
SEMI-LINEAR FRACTIONAL LAPLACE EQUATION
THROUGH A ONE-DIMENSIONAL ANALYSIS**

A. QUAAS

ABSTRACT. In this paper we analyze the semi-linear fractional Laplace equation

$$(-\Delta)^s u = f(u) \quad \text{in } \mathbb{R}_+^N, \quad u = 0 \quad \text{in } \mathbb{R}^N \setminus \mathbb{R}_+^N,$$

where $\mathbb{R}_+^N = \{x = (x', x_N) \in \mathbb{R}^N : x_N > 0\}$ stands for the half-space and f is a locally Lipschitz nonlinearity. We completely characterize one-dimensional bounded solutions of this problem, and we prove among other things that if u is a bounded solution with $\rho := \sup_{\mathbb{R}^N} u$ verifying $f(\rho) = 0$, then u is necessarily one-dimensional.

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`