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### ACCEPTED MANUSCRIPT

## Positive radial solutions for a class of singular superlinear problems on the exterior of a ball with nonlinear boundary conditions

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#### Abstract

We discuss existence and nonexistence results of positive radial solutions to the problem

$$\begin{pmatrix} -\Delta u = \lambda K(|x|)f(u) \text{ in } |x| > r_0, \\ \frac{\partial u}{\partial n} + \tilde{c}(u)u = 0 \text{ on } |x| = r_0, \quad u(x) \to 0 \text{ as } |x| \to \infty. \end{cases}$$

where  $\Omega = \{x \in \mathbb{R}^N : |x| > r_0 > 0\}, N > 2, f : (0, \infty) \to \mathbb{R}$  is continuous, superlinear at  $\infty$ , and is allowed to be singular at 0 with no sign conditions near 0.

### 1. INTRODUCTION

Consider the boundary value problem

$$\begin{cases} -\Delta u = \lambda K(|x|) f(u) \text{ in } \Omega, \\ \frac{\partial u}{\partial n} + \tilde{c}(u)u = 0 \text{ on } |x| = r_0, \\ u(x) \to 0 \text{ as } |x| \to \infty, \end{cases}$$
(1.1)

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