

1146-35-406

**D D Hai** (dang@math.msstate.edu) and **R Shivaji\*** (shivaji@uncg.edu), Dept of Mathematics & Statistics, University of North Carolina at Greensboro, Greensboro, NC 27412. *Existence and multiplicity of positive radial solutions for singular superlinear elliptic systems in the exterior of a ball.*

We prove the existence and multiplicity of positive radial solutions to the nonlinear system

$$\begin{cases} -\Delta u_i = \lambda K_i(|x|) f_i(u_j) \text{ in } \Omega, \\ d_i \frac{\partial u_i}{\partial n} + \tilde{c}_i(u_i) u_i = 0 \text{ on } |x| = r_0, \\ u_i(x) \rightarrow 0 \text{ as } |x| \rightarrow \infty, \end{cases}$$

for a certain range of  $\lambda > 0$ , where  $i, j \in \{1, 2\}, i \neq j$ ,  $\Omega = \{x \in \mathbb{R}^N : |x| > r_0 > 0\}$ ,  $N > 2, d_i \geq 0$ ,  $K_i : [r_0, \infty) \rightarrow (0, \infty)$ ,  $\tilde{c} : [0, \infty) \rightarrow [0, \infty)$ ,  $f_i : (0, \infty) \rightarrow \mathbb{R}$  are continuous with possible singularity  $\pm\infty$  at 0 and satisfy a combined superlinear condition at  $\infty$ . (Received January 28, 2019)