Maya Chhetri, Lakshmi Sankar, Ratnasingham Shivaji and Byungjae Son*
(b_son@uncg.edu), 830 W Market Street, Apt 623, Greensboro, NC 27401. An existence result for superlinear semipositone \( p \)-Laplacian systems on the exterior of a ball.

We study the existence of positive radial solutions to the problem

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\begin{align*}
-\Delta_p u &= \lambda K_1(|x|)f(v) \quad \text{in } \Omega_e, \\
-\Delta_p v &= \lambda K_2(|x|)g(u) \quad \text{in } \Omega_e, \\
u = v = 0 & \quad \text{if } |x| = r_0, \\
u(x) \to 0, v(x) \to 0 & \quad \text{as } |x| \to \infty,
\end{align*}
\]

where \( \Delta_p w := \text{div}(|\nabla w|^{p-2} \nabla w) \), \( 1 < p < n \), \( \lambda \) is a positive parameter, \( r_0 > 0 \) and \( \Omega_e := \{x \in \mathbb{R}^n \mid |x| > r_0\} \). Here \( K_i : [r_0, \infty) \to (0, \infty) \), \( i = 1, 2 \) are continuous functions such that \( \lim_{r \to \infty} K_i(r) = 0 \), and \( f, g : [0, \infty) \to \mathbb{R} \) are continuous functions which are negative at the origin and have a superlinear growth at infinity. We establish the existence of a positive radial solution for small values of \( \lambda \) via degree theory and rescaling arguments. (Received June 30, 2017)