1116-35-2583 **R. Dhanya**, **Quinn Morris*** (qamorris@uncg.edu) and **R. Shivaji**. *Existence of positive radial solutions for superlinear, semipositone problems on the exterior of a ball.*

We study positive radial solutions to $-\Delta u = \lambda K(|x|) f(u)$; $x \in \Omega_e$ where $\lambda > 0$ is a parameter, $\Omega_e = \left\{ x \in \mathbb{R}^N \mid |x| > r_0, r_0 > 0, N > 2 \right\}$, Δ is the Laplacian operator, $K \in C\left([r_0, \infty), (0, \infty)\right)$ satisfies $K(r) \leq \frac{1}{r^{N+\mu}}$; $\mu > 0$ for $r >> 1$, and $f \in C^1\left([0, \infty), \mathbb{R}\right)$ is a class of non-decreasing functions satisfying $\lim_{s\to\infty} \frac{f(s)}{s} = \infty$ (superlinear) and $f(0) < 0$ (semipositone). We consider solutions, u, such that $u \to 0$ as $|x| \to \infty$, and which also satisfy the nonlinear boundary conditon $\frac{\partial u}{\partial \eta} + \tilde{c}(u) u = 0$ when $|x| = r_0$, where $\frac{\partial}{\partial \eta}$ is the outward normal derivative, and $\tilde{c} \in C\left([0, \infty), (0, \infty)\right)$. We will establish the existence of a positive radial solution for small values of the parameter λ. We also establish a similar result for the case when u satisfies the Dirichlet boundary conditon $(u = 0)$ for $|x| = r_0$. We establish our results via variational methods, namely using the Mountain Pass Lemma. (Received September 22, 2015)