1056-34-350 **Jerome Goddard II*** (jg440@msstate.edu), P.O.Drawer MA, Mississippi State, MS 39762, **EunKyoung Lee** (eunkyoung165@gmail.com), Department of Mathematics, Pusan National University, Pusan, South Korea, and **Ratnasingham Shivaji** (shivaji@ra.msstate.edu), P.O.Drawer MA, Mississippi State, MS 39762. *On the existence of a double S-shaped bifurcation curve.*

We study the positive solutions to boundary value problems of the form

$$\begin{aligned} -u'' - \frac{n-1}{r}u' &= \lambda f(u); \quad \Omega \\ -\alpha(x,u)u'(r) + [1-\alpha(x,u)]u(r) &= 0; \quad |x| = R_1 \\ \alpha(x,u)u'(r) + [1-\alpha(x,u)]u(r) &= 0; \quad |x| = R_2 \end{aligned}$$

where $\Omega = \{x | R_1 < |x| < R_2\}$ is an annulus in $\mathbb{R}^n$ with $n \geq 1$, $\lambda$ is a positive parameter, $f : [0,\infty) \longrightarrow (0,\infty)$ is a smooth function which is sublinear at $\infty$, and $\alpha(x,u) : \Omega \times \mathbb{R} \longrightarrow [0,1]$ is a non-decreasing smooth function. In particular, we discuss the existence of at least two positive radial solutions for $\lambda \gg 1$. Further, we discuss the existence of a double S-shaped bifurcation curve when $n = 1$, $\Omega = (0,1)$, and $f(s) = e^{\frac{\beta s}{\beta + s}}$ with $\beta \gg 1$. (Received September 01, 2009)