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

\[-u'' - \frac{n-1}{r} u' = \lambda f(u); \quad \Omega\]

\[-\alpha(x,u)u'(r) + [1 - \alpha(x,u)]u(r) = 0; \quad |x| = R_1\]

\[\alpha(x,u)u'(r) + [1 - \alpha(x,u)]u(r) = 0; \quad |x| = R_2\]

where \(\Omega = \{x | R_1 < |x| < R_2\}\) is an annulus in \(\mathbb{R}^n\) with \(n \geq 1\), \(\lambda\) is a positive parameter, \(f : [0, \infty) \rightarrow (0, \infty)\) is a smooth function which is sublinear at \(\infty\), and \(\alpha(x,u) : \Omega \times \mathbb{R} \rightarrow [0,1]\) 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 \(f(s) = e^{\frac{\beta s}{s+\delta}}\) with \(\beta \gg 1\). (Received September 01, 2009)