On semilinear elliptic systems with superlinear boundary conditions

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We investigate a system of elliptic equations characterized by superlinear and subcritical boundary conditions with a bifurcation parameter. By employing a combination of rescaling techniques and degree theory, one can show the existence of a connected branch of positive solutions bifurcating from infinity as the parameter approaches zero if the nonlinearities have power type growth at infinity. Under additional conditions on the nonlinearities near zero, we discuss the existence of a global, connected branch of positive solutions bifurcating from the line of trivial solutions, with a unique bifurcation point from infinity when the bifurcation parameter is zero. We employ bifurcation theory, degree theory, and sub- and super-solution method to obtain our results.