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ON THE OSCILLATIONS OF THE SOLUTION CURVE FOR A CLASS OF SEMILINEAR EQUATIONS

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We use the bifurcation theory to investigate a number of positive solutions of the semilinear Dirichlet boundary value problem on a ball in Rn for the second order elliptic equation with periodic nonlinearity containing a positive parameter. We show that if the dimension n of the variables is less than or equal 5, the problem has infinitely many positive solutions when the parameter coincides with the principal eigenvalue of the Laplace operator. At any other value of the parameter or if the dimension n exceeds 5, the number of positive solutions is at most finite. Our approach appeals to the well known results of B. Gidas, W.-M. Ni, L. Nirenberg, the bifurcation theorems of M.G.Crandall, and P.H.Rabinowitz and the stationary phase method.

The presentation is based on the joint paper with Philip Korman, University of Cincinnati and Yi Li, University of Iowa.