

The Brézis–Nirenberg Problem on S^3

Catherine Bandle & Rafael Benguria

Abstract

In this paper we study existence and nonexistence of solutions to the Brézis–Nirenberg problem for different values of λ in geodesic spheres on S^3 . The picture differs considerably from the one in the Euclidean space. It is shown that large spheres containing the hemisphere have two different type of radial solutions for negative values of λ . Numerical results indicate that for λ very small the solutions have a maximum near the boundary, whereas for larger values of λ the maximum is at the origin. The techniques used are: Pohozaev type identities, concentration-compactness lemma and numerical methods.