

The Lane-Emden Equation Revisited

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Abstract

Several results concerning existence and nonexistence of radial (but not necessarily positive) solutions to the nonlinear boundary value problem

$$-\Delta u = \lambda u + |u|^{p-1}u,$$

On a (geodesic) ball of \mathbb{R}^N or \mathbb{S}^3 , with Dirichlet boundary condition are presented (depending on the possible values of λ and the exponent p). The dependence on the underlying space is illustrated through a discussion of the boundary value problem on \mathbb{S}^3 .