Seminário de Análise

Positive Solutions of Nonlinear Field Equations

Liliane A. Maia
Universidade de Brasília

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Abstract. We will present some recent results on the existence and multiplicity of positive solutions to the problem

$$-\Delta u + V(x)u = f(u), \qquad x \in \Omega \subset \mathbb{R}^N, \qquad u(x) \to 0 \ \text{ as } \ |x| \to \infty,$$

for $N \geq 3$, Ω a regular unbounded exterior domain or $\Omega = \mathbb{R}^N$, when either the nonlinearity f is subcritical and superquadratic or asymptotically linear at infinity, in case V approaches a positive constant limit at infinity, or f is subcritical at infinity and supercritical near the origin if the potential V vanishes at infinity. Under a suitable decay assumption on the potential V, we show that the problem has a positive bound state, including situations in which the problem does not have a ground state. Multiplicity of positive solutions under symmetry is obtained. This is work in collaboration with Mónica Clapp (UNAM, México) and Alireza Khatib (UnB, Brazil).