The Nehari-Pankov manifold revisited

Andrzej Szulkin (Stockholm)

Abstract: We study the Schrödinger equations

$$-\Delta u + V(x)u = f(x,u) \quad \text{in } \mathbb{R}^N$$

and

$$-\Delta u - \lambda u = f(x,u) \quad \text{in a bounded domain } \Omega \subset \mathbb{R}^N.$$

We assume that f is superlinear but of subcritical growth and $u \mapsto f(x,u)/|u|$ is non-decreasing. In $\mathbb{R}^N$ we also assume that V and f are periodic in $x_1, \ldots, x_N$. We show that these equations have a ground state solution and also briefly discuss existence of infinitely many solutions if f is odd in u. Our results generalize older ones where $u \mapsto f(x,u)/|u|$ was assumed to be strictly increasing. This seemingly small change forces us to go beyond methods of smooth analysis.

This is joint work with Francisco Odair de Paiva and Wojciech Kryszewski.