A simple approach to entire normalized solutions to an elliptic Schrödinger equation in the $L^2$-(super)critical and Sobolev-critical case

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Schrödinger-type equations model a lot of natural phenomena and their solutions have interesting and important properties. This gives rise to the search for normalized solutions, i.e., when the $L^2(\mathbb{R}^N)$ norm is prescribed. We propose a simple and novel approach, based on a minimization argument and introduced in [1], to study problems of the form

\[
\begin{cases}
-\Delta u + \lambda u = g(u), \\
u \in H^1(\mathbb{R}^N), \\
\int_{\mathbb{R}^N} u^2 dx = \rho^2,
\end{cases}
\]

where $N \geq 3$, $\rho > 0$ is given a priori, $\lambda \in \mathbb{R}$ is part of the unknown, and $g: \mathbb{R} \to \mathbb{R}$ has Sobolev-critical growth at infinity and $L^2$-(super)critical and Sobolev-subcritical growth at the origin.

This talk is based on joint work with Jarosław Mederski [2].

References

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