Abstract

In this talk we will present an alternative approach to the normalized solutions (λ, u) of the 1-D nonlinear Schördinger equation:

$$
\begin{aligned}
&-u'' + \lambda u = g(u), \quad x \in \mathbb{R}, \\
&\int_{\mathbb{R}} u^2 dx = a > 0.
\end{aligned}
\tag{1}
$$

Given $\lambda > 0$, it is easy to see there is a solution $u_\lambda \in H^1(\mathbb{R})$ of

$$
-u'' + \lambda u = g(u), \tag{2}
$$

which is called a homolinic solution in dynamical systems. We will give a detail analysis of $\int_{\mathbb{R}} u_\lambda^2 dx$ as λ varies from 0 to ∞. As consequences, some well known results of solutions of (1) are recovered.