

# Spectral Theory Approach for a Class of Radial Indefinite Variational Problems

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Considering the radial nonlinear Schrödinger equation

$$-\Delta u + V(x)u = g(x, u) \quad \text{in } \mathbb{R}^N, \quad N \geq 3 \quad (\text{Pr})$$

we aim to find a radial nontrivial solution for it, where  $V(x)$  changes sign ensuring problem (Pr) is indefinite and is an asymptotically linear nonlinearity. We work with variational methods associating problem (Pr) to an indefinite functional in order to apply our Abstract Linking Theorem for Cerami sequences to get a non-trivial critical point for this functional. Our goal is to make use of spectral properties of operator  $A := -\Delta + V(x)$  restricted to  $H_{rad}^1(\mathbb{R}^N)$ , the space of radially symmetric functions in  $H^1(\mathbb{R}^N)$ , for obtaining a linking geometry structure to the problem and by means of special properties of radially symmetric functions get the necessary compactness.