Undergraduate

Analysis Seminar

On the orbital stability of ground states with prescribed action value for the non-linear Schrödinger equation

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Abstract. We discuss the nonlinear generalized Rayleigh quotients method [1] as a new tool, which can be deployed in studying the orbital stability of ground states of the nonlinear Schrödinger (NLS) equations. We introduce a variational functional, in which the global minimizer corresponds to the so-called fundamental frequency solutions [2] with prescribed action value. We exhibit the method on the examples of studying of the orbital stability of ground states for the non-linear Schrödinger equation with a harmonic potential [3].

References

[1] Y. Sh. Ilyasov, On extreme values of Nehari manifold method via nonlinear Rayleigh's quotient, TMNA , 49 (2017), doi.org/10.12775/TMNA.2017.005

[2] Y. Il'yasov, Fundamental Frequency Solutions with Prescribed Action Value to Nonlinear Schrödinger Equations, JMS, (2021), doi.org/10.1007/s10958-021-05610-0

[3] R. Carles, Y. Ilyasov, On ground states for the $2D$ Schrodinger equation with combined nonlinearities and harmonic potential, arXiv:2110.06576. (2021).