On the Classification of the Spectrally Stable Standing Waves of the Hartree Problem

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We consider the fractional Hartree model, with general power non-linearity and space dimension. We construct variationally the normalized solutions for the corresponding Choquard-Pekar model. In particular a number of key properties, like smoothness and bell-shapedness are established. As a consequence of the construction, we show that these solitons are spectrally stable.

In addition, we analyze the spectral stability of the Moroz-Van Schaftingen solitons of the classical Hartree problem, in any dimensions and power non-linearity. A full classication is obtained, the main conclusion of which is that only and exactly the normalize solutions are spectrally stable.