Topological **M**ethods in **N**onlinear **A**nalysis
Volume 59, No. 2B, 2022, 819–832
DOI: 10.12775/TMNA.2021.037

ON THE CHOQUARD EQUATIONS UNDER THE EFFECT OF A GENERAL NONLINEAR TERM

Jiu Liu — Jia-Feng Liao — Hui-Lan Pan — Chun-Lei Tang

Abstract. We investigate the existence and properties of ground state solutions for a class of nonlinear Choquard equations. Proofs are mainly based on the variational method.

1. Introduction and main results

In the classic paper [3], H. Berestycki and P.-L. Lions investigated the following Schrödinger equation

$$-\Delta u = f(u) \quad \text{in } \mathbb{R}^3, \tag{1.1}$$

where f satisfies:

(f_1) $f \in C(\mathbb{R}, \mathbb{R})$ is odd,

(f_2) $-\infty < \liminf\limits_{s\to 0^+} \dfrac{f(s)}{s} \le \limsup\limits_{s\to 0^+} \dfrac{f(s)}{s} = -m < 0$,

(f_3) $\lim\limits_{s\to+\infty} \dfrac{f(s)}{s^5} = 0$,

2020 *Mathematics Subject Classification.* Primary: 35J20; Secondary: 35B38.
Key words and phrases. Choquard equations; variational method; Pohožaev manifold; ground state solution.
The first author was supported in part by NNSFC Grant 11861052, Science and Technology Foundation of Guizhou Province Grant [2019] 5672 and Innovation group project of Education Department of Guizhou Grant [2019] 067.
The fourth author was supported in part by NNSFC Grant 11971393.