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GENERALIZED SCHRÖDINGER EQUATION WITH A NONLOCAL TERM: EXISTENCE AND ASYMPTOTIC BEHAVIOR OF POSITIVE SOLUTIONS

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Abstract. We establish existence results for a generalized Schrödinger equation on a smooth bounded domain in $\mathbb{R}^N$, which appears naturally in several applications of mathematical physics. The nonlinearity considered in the equation depends on a concave and sublinear–nonlocal terms that may be concave–convex. In such a case, variational methods cannot be applied. Our approach is based on a suitable change of variables, which transforms the original problem into an equivalent semilinear one. The positive solutions to semilinear equations are then presented using the Galerkin method together with a variation of the fixed point theorem. We also study the asymptotic behavior of the solutions with respect to the parameters. An important feature is that there are few works in the literature for the type of problem considered here, and the Galerkin method was not used to consider generalized quasilinear Schrödinger equations with nonlocal terms.

1. Introduction

Let $\Omega \subset \mathbb{R}^N$ be a bounded domain with a smooth boundary $\partial\Omega$. The aim of this paper is to investigate the following stationary generalized Schrödinger

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