Abstract

The aim of this talk is to introduce some recent research progress of the following elliptic equation with Stein-Weiss type convolution part

$$\begin{equation}
-\Delta u = \left( \int_{\mathbb{R}^n} \frac{|u(y)|^p}{|x|^\alpha|x-y|^\mu|y|^\beta} dy \right) |u|^{q-1} u, \quad \text{in} \quad \mathbb{R}^N,
\end{equation}$$

where $N \geq 3$, $0 < \mu < N$, $\alpha \geq 0$, $\beta \geq 0$, $0 < \alpha + \beta + \mu \leq N$ and $p, q > 1$.

Firstly, we are interested in the qualitative properties, such as the symmetry, regularity and asymptotical behavior of the positive solutions. Secondly, we aim to classify the non-positive solutions by proving some Liouville type theorems for the finite Morse index solutions and stable solutions of the nonlocal elliptic equations with double weights.