Mean fields equations and its applications

Changshou Lin

Abstract: In my talk, I will discuss the estimates of bubbling profile of
mean fields equations or systems, the counting formulas for the Leray-
Schauder degree for the solution set. The counting formulas depends
on the topology of the underlying two-dimenstional space. However, at
those critical parameters, the counting degree formulas depends on the
geometry of the spaces.Thus, we will discuss a sufficient and necessary
condition for the solavability of solutions of mean field equations at the
critical parameters. The condition is expressed in term of the green
functions. In particular, we will find some application to a self-dual
equation of electroweak theory. The mean fields equation is closedly
related to the behavior of the green fuction. We also apply the nonlinear
PDE method to show the Green function on the flat torus has at most
five critical points.