变分法与交叉科学

丁彦恒

中国科学院数学与系统科学研究院，北京，100190

摘要

一般半线性问题的变分框架；特别如 Hamilton 系统、反应扩散系统、Dirac 方程等；进而谈一些变分方法对交叉科学的作用。

非线性椭圆方程的 Liouville 型定理和孤立奇点问题

邹文明

清华大学数学科学系，北京，100084

摘要

将报告拟线性椭圆方程组和非线性 Schrödinger 方程组在全空间上有限 Morse 指标解的 Liouville 型定理和在半空间上有限 Morse 指标解的 Liouville 型定理。此外，还讲涉及双调和 Lane-Emden 方程的孤立奇点和耦合 Schrödinger 型方程组的孤立奇点问题。

Hénon-Lane-Emden conjecture and related Schrödinger systems

张志涛

中国科学院数学与系统科学研究院，北京，100190

Abstract

We have proved Hénon-Lane-Emden conjecture is true for space dimension $N = 3$ by scaling invariant of the solutions and Sobolev embedding on S^{N-1}. Then we obtained new Liouville-type theorems and showed Henon-Lane-Emden conjecture for polyharmoic system holds in a new region, and also proved the generalized Hénon-Lane-Emden conjecture in $\mathbb{R}^2$ and $\mathbb{R}^3$. Moreover, we prove some new results on related Schrödinger systems.

Discrete L_p-Minkowski problem in dimension 2 for $p < 0$

蒋美跃

北京大学数学科学学院，北京，100871

Abstract

The L_p-Minkowski problem proposed by Lutwak is a natural and important generalization of the classical Minkowski problem, and it can be stated as follows: Given a finite Borel measure μ on S^{n-1} to find a convex body K in $\mathbb{R}^n$ and the origin be in its interior such that its L_p surface measure is μ :

$$S_p(K, \omega) = \mu(\omega), \quad \forall \text{ Borel set } \quad \omega \subset S^{n-1}.$$

In this talk we will present some results in the case $n = 2$ and $p < 0$ based on the variational methods.

Nondegeneracy for multiple solutions and applications

郭玉霞

清华大学数学科学系，北京，100084

Abstract

We consider the following prescribed scalar curvature equations in $\mathbb{R}^N$

$$-\Delta u = K(|y|)u^{2^*-1}, \quad u > 0 \ \text{ in } \mathbb{R}^N, \quad u \in D^{1,2}(\mathbb{R}^N), \tag{1}$$

where $K(r)$ is a positive function, $2^* = \frac{2N}{N-2}$. We Will talk about a non-degeneracy result for the positive multi-bubbling solutions by using the local Pohozaev identities. Then we use this non-degeneracy result to glue together bubbles with different concentration rate to obatin new solutions.

This is joint work with Musso, Peng and Yan

On the Ground States of Rotating Bose-Einstein Condensates with Attractive Interactions

郭玉劲

华中师范大学数学与统计学学院，武汉，430079

Abstract

This talk is focussed on ground states of two-dimensional attractive Bose-Einstein condensates (BEC) in a rotating trap, which can be described by the complex-valued Gross-Pitaevskii energy functional. We discuss the existence and nonexistence of ground states, depending on the trap' s rotational velocity V and the attractive strengthen N of cold atoms as well. We also introduce the limit behavior of ground states. Further, as N approaches to a critical value and the rotational velocity V is low, we prove that, up to the phase rotation, all ground states are real-valued, unique and free of vortices. This gives the nonexistence of vortex states for rotating BEC.

Ground state for Schrödinger-Poisson-Slater system with unbounded potential

王征平

武汉理工大学理学院，武汉，430070

Abstract

In this talk, we give some recent results on the existence of ground state for nonlinear Schrödinger-Poisson-Slater equation with unbounded potential. By using Ekeland’s variational principle and constrained minimization approach, we prove that there exists a ground state with negative energy. For the special case of Schrödinger-Poisson-Slater equation with harmonic potential, we show that the ground state must be nonradial.

Solutions concentrating at non-isolated critical points for Schrodinger equations and Bose-Einstein condensates

严树森

华中师范大学数学与统计学学院，武汉，430079

Abstract

In this talk, I will present some results on the Bose-Einstein condensates in two dimensions with attractive interactions. We study this condensate problem with a different method. Such method enable us to prove the existence of the excited states without much difficulties.

Recent results on the semiclassical solutions of the two-component elliptic system in $\mathbb{R}^4$ with the critical Sobolev exponent

吴元泽

中国矿业大学数学学院，徐州，221116

Abstract

In this talk, I will introduce some recent results on the semiclassical solutions of the two-component elliptic system in R4 with the critical Sobolev exponent, which are mainly about the influence of lower order perturbations on the existence of semiclassical solutions by using variational methods. The concentration behaviors of solutions the locations of spikes are also considered. This talk is based on the recent works with professor Wenming Zou.

Existence of infinitely many solutions of p-Laplacian equations in $\mathbf{R}^N_+$

刘祥清

云南师范大学数学学院，昆明，650500

Abstract

In this paper, we study the p-Laplacian equation

$$\begin{cases} -\Delta_p u = 0 \quad \text{in } \mathbf{R}^N_+, \\ |\nabla u|^{p-2}\dfrac{\partial u}{\partial n} + a(y)|u|^{p-2}u = |u|^{q-2}u \quad \text{on } \partial\mathbf{R}^N_+, \end{cases}$$

where $1 < p < N$, $p < q < \bar{p} = \dfrac{(N-1)p}{N-p}$, $\Delta_p u = \operatorname{div}(|\nabla u|^{p-2}\nabla u)$ is the p-Laplacian operator, and the positive, finite function $a(y)$ satisfies suitable decay assumptions at the infinity. By using the truncation method, we prove the existence of infinitely many solutions of the problem.

Asymptotics in nonlinear scalar field equation

王志强

福建师范大学数学与信息学院，福州，350007

Department of Mathematics and Statistics, Utah State University, Logann UT, 84322, USA

Abstract

Nonlinear scalar field equation is one of the most-studied and well understood nonlinear elliptic equations. We report recent work on the asymptotic behavior of ground state solutions. As applications this yields a direct proof of the logarithmic Sobolev inequality by passing limit in the Sobolev embedding.