

Interfaces of Boltzmann–Poisson Equations – Analysis, Geometry, Physics

Machikaneyama Kaikan, Toyonaka Campus, Osaka University

2013. 08. 20. (Tues.)

1355–1400 Opening Address

1400–1450 Futoshi Takahashi (Osaka City University)

Convergence for a 2D elliptic problem with large exponent in nonlinearity

In this talk, we consider the semilinear elliptic problem of Emden–Fowler type with the large exponent in nonlinearity. The main purpose of this talk is to investigate the asymptotic behavior of general solutions u_p , not necessarily least energy ones, when the nonlinear exponent p gets large. We prove that along a subsequence, mass quantization phenomenon occurs, and according to the quantized values, the entire blow-up or N -points concentration holds true. Also we obtain a characterization of each concentration point as a critical point of some function defined by the Green function and the coefficient function. These results are obtained by using ideas and techniques from the recent paper by S. Santra and J.C. Wei with suitable modifications.

1500–1550 Tohru Kan (Tokyo Institute of Technology)

On the structure of solutions to the Liouville equation in non-simply connected domains

We consider the Liouville equation in planar domains. It is known that the topology of domains strongly influences the structure of solutions. In this talk we particularly discuss the structure in the case a domain has a small hole (non-simply connected case in particular). Then it is observed that the equation has a solution with a peak near the hole provided that the gradient of the Robin function (in a domain the hole of which is excluded) does not vanish at the center of the hole. We also discuss how a mass of the solution behaves as it blows up.

1600–1650 Hiroshi Ohtsuka (Kanazawa University)

Morse indices of multiple blow-up solutions to the two-dimensional

Gel'fand problem

Blow-up solutions to the two-dimensional Gel'fand problem are studied. It is known that the location of the blow-up points of these solutions is related to a Hamiltonian function involving the Green function of the domain. We show that this implies an equivalence between the Morse indices of the solutions and the associated critical points of the Hamiltonian. This is a joint work with F. Gladiali (Sassari Univ.), M. Grossi (Roma "La Sapienza" Univ.), and T. Suzuki (Osaka Univ.).

1720–1810 Andrea Malchiodi (Warwick University)

Uniformizing surfaces with conical singularities

We consider a class of singular Liouville equations which arise from the problem of prescribing the Gaussian curvature of a compact surface imposing a given conical structure at a finite number of points. The problem is variational and differently from the classical uniformization problem the Euler–Lagrange functional might be unbounded from below. We will look for critical points of saddle type using a combination of improved geometric inequalities and topological methods. This is joint work with D. Bartolucci, A. Carlotto, F. De Marchis and D. Ruiz.

1820–1910 Takashi Suzuki (Osaka University)

Blowup in infinite time for 2D Smoluchowski–Poisson Equation

We study the Smoluchowski–Poisson equation in two space dimensions. For this equation collapses with quantized mass are formed in finite time. Concerning the blowup in infinite time the formation of collapses with quantized mass has been known. Here we show the residual vanishing. Consequently, blowup in infinite time does not occur unless the total mass is quantized. These collapses move along the gradient flow derived from point vortex Hamiltonian. Related results are also discussed.

1910–1915 Closing Address

1930– Banquet

Welfare Center 4F Cafeteria

Special Lecture for PhD Students by Andrea Malchiodi

2013. 08. 21. (Wed.) 1100-1200

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Toyonaka Campus

