

Division of Mathematical and Physical Sciences	Research field	Mathematical Analysis	Lab. ID
			MP04
Laboratory web site	http://nlpde.w3.kanazawa-u.ac.jp/kas/		
Research subjects			
<p>Differential equations are formulae that represent the relations between varying quantities. They have their origin when Newton related changes of momentum with forces. Nowadays varieties of natural phenomena such as physical laws, chemical reactions, and biological phenomena, as well as several concepts of mathematics itself are represented by differential equations. The topics are vast and the typical ones in our group are as follows: dynamical systems, especially integrable Hamiltonian systems and their perturbations, reaction-diffusion systems (theoretical and numerical study), non-linear elliptic equations.</p>			
Master/Doctor course: Education policy, curriculum, typical activity in the laboratory			
<p>Members of the Mathematical Analysis staff are engaged in different research areas of their own interest, therefore, each student basically studies under guidance and supervision by one principal advisor of the staff. In order to broaden your vision, you are encouraged to attend seminars held by other staff members and "Kanazawa Analysis Seminar" jointly organized by Mathematical Analysis and Applied Computational Mathematics groups. In the first year of the master course, you will read basic textbooks and give presentations at seminar every week. In the second year, you will start your own research under the direction by your advisor. The doctor course students pursue research, and write and publish scientific papers.</p>			
Daily life in the laboratory, etc.			
<p>One student office for every 4 or 5 students is provided and a personal working desk is available in the office. One desktop PC and one laser printer are also available in each office. Usually students of the same adviser and the same grade share an office. You are able to use your office and equipment there at any time. You may have to prepare your presentation for seminar until late at night there, but your classmate, especially your officemate, will give you a good support.</p>			
Message or comments by the laboratory faculty staffs			
<p>To study mathematics is not easy. It is also true for us staff. You may, however, find someday that the key to understanding some chaotic matters is only a very simple fact. We hope to hear in the seminar your discovery after your long and hard thinking. We are sure that such an experience will be useful in every occupation. Graduates of our group work as teachers at high schools, office workers, researchers, etc. We hope you consider deeply and flexibly, as you do in studying mathematics, how you are able to contribute the society.</p>			
Recent Master theses in these 3 years (+ more if appropriate)			
year.month	Thesis title (including English translation of Japanese thesis title)		
2017.3	On semilinear elliptic boundary value problems with isolated singularities		
2017.3	Analysis of a finite difference scheme for the Fisher equation with free boundaries		
2017.3	Numerical methods for a free boundary problem modeling biological invasions		
2017.3	On Green's functions for Laplace's equation in annular domains		
2017.3	KAM theory and its application to the restricted three-body problem		
2017.3	On perturbations of polygonal vortex arrays		
2016.3	Existence of limit cycles for mathematical models in ecology		
2015.3	On limit cycles of polynomial vector fields on the plane		
2015.3	On periodic orbits for elliptical billiards		
2015.3	Existence of periodic orbits for the restricted three-body problem		
2015.3	A study on the boundary layer of a flow with circular streamlines		
2015.3	On the classical solutions for initial value problems of conservation laws		
2015.3	The speed of biological invasions into heterogeneous environments: A derivation via the homogenization method		
2015.3	Turing instabilities in a reaction-diffusion system with fractional order time derivatives		
2015.3	Blow-up problems for heat equations with spatially inhomogeneous nonlinear terms		
2014.3	Local conjugacy and linearizability conditions for a holomorphic mapping near a fixed point		
2014.3	Structure preserving numerical methods and conserved quantities for Keplerian motion		
2014.3	Delaunay variables and Poincaré variables for the three dimensional Kepler problem		
2014.3	Dynamics of fronts of a bistable reaction-diffusion system in two-dimensional domains		
2013.9	A Study on Stability Change of Periodic Orbits and the Phase Space Structure for Two-degree-of-freedom Hamiltonian Systems		
2013.3	Chaotic billiards defocused by convex-like boundaries		
2013.3	On the existence of quasi-periodic solutions for nearly integrable systems		
2013.3	Rigorous computation for stationary solutions of FitzHugh-Nagumo equation		

Recent Doctoral theses in these 3 years (+ more if appropriate)	
year.month	Thesis title (including English translation of Japanese thesis title)
2014.3	A Probabilistic Approach to the Zero-Mass Limit Problem for a Spinless Particle in Relativistic Quantum Mechanics
2014.3	A structure-preserving numerical method for partial difference equation via a new formulation of the discrete variational derivative method
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