

Workshop on Analysis and Optimization

Organizer: Research Center for Nonlinear Analysis and Optimization and Department of Applied Mathematics, National Sun Yat-sen University, Taiwan

Contact Persons: Ngai-Ching Wong and Hong-Kun Xu

Date: Monday, February 6, 2012

Venue: Room 4009-1, Science Building, National Sun Yat-sen University

Speakers:

- Professor Wataru Takahashi, Tokyo Institute of Technology, Tokyo
- Professor Jin Liang, Shanghai Jiaotong University, Shanghai
- Professor Tiejun Xiao, Fudan University, Shanghai
- Professor Yonghong Yao, Tianjin Polytechnic University, Tianjin
- Dr. Ming-Cheng Tasi, National Sun Yat-sen University, Kaohsiung
- Dr. Ming-Hsiu Hsu, National Sun Yat-sen University, Kaohsiung

Programs

Opening Ceremony: 10:00-10:10, Feb 4, 2012

Chairs: Ngai-Ching Wong and Hong-Kun Xu

Lecture One: 10:10-11:00 (Chair: Professor Hong-Kun Xu)

Speaker: Professor Jin Liang

Title: Solutions to abstract integral equations and infinite delay evolution equations

Abstract: We are concerned with the Cauchy problem for integral equations with infinite delay and semilinear evolution equations with infinite delay in Banach spaces. We first establish some general criteria to judge the existence of Lipschitz continuous solutions to the Cauchy problem for these general abstract integral equations with infinite delay, and then, by means of the criteria obtained, we give some new existence theorems for strong and classical solutions to the Cauchy problem for infinite delay semilinear evolution equations. Moreover, an example is given to illustrate the abstract result.

Lecture Two: 11:10-12:00 (Chair: Professor Ngai-Ching Wong)

Speaker: Professor Tijun Xiao

Title: Differential operators as generators of strongly continuous cosine functions

Abstract: Of concern is a basic generation problem about a class of second order differential operators in the space of complex continuous functions equipped with general dynamic boundary conditions, which originates from a work of W. Feller in 1950s published in 'Ann. of Math.'. Based on an operator matrix analysis combined with perturbation, approximation, and similarity techniques in operator theory, we present a solution to this problem by proving that these second order differential operators, under suitable assumptions, generate strongly continuous cosine functions on the Banach space $C[0,1]$ or the Sobolev space $W^{1,p}(0,1)$ ($1 \leq p \leq \infty$).

Lunch Break: 12:00-13:30

Lecture Three: 13:30-14:20 (Chair: Professor Jen-Chi Yao)

Speaker: Professor Yonghong Yao

Title: Applications of Fixed Point and Optimization Methods to the Multiple-sets Split Feasibility Problem

Abstract: The multiple-sets split feasibility problem requires finding a point closest to a family of closed convex sets in one space such that its image under a linear transformation will be closest to another family of closed convex sets in the image space. It can be a model for many inverse problems where constraints are imposed on the solutions in the domain of a linear operator as well as in the operator's range. It generalizes the convex feasibility problem as well as the two sets split feasibility problem. In this talk, we shall review and report some recent results on iterative approaches to the multiple-sets split feasibility problem.

Lecture Four: 14:25-15:15

Speaker: Dr. Ming-Cheng Tsai (Chair: Professor Tijun Xiao)

Title: A study of numerical ranges of operators and matrices

Abstract: Let A be the n -by- n ($n \geq 2$) weighted shift matrix $[t_{ij}]$, where $t_{i,i+1} = a_i$ for $i = 1, 2, \dots, n-1$, $t_{n,1} = a_n$ and $t_{ij} = 0$ otherwise. We show that the boundary of its numerical

range contains a line segment if and only if the a_i 's are nonzero and the numerical ranges of the $(n-1)$ -by- $(n-1)$ principal submatrices of A are all equal. Using this, we obtain that the boundary of the numerical range of an n -by- n weighted shift matrix A has a line segment if the a_i 's are nonzero and their moduli are periodic. We also prove that $\partial W(A)$ contains a noncircular elliptic arc if and only if the a_i 's are nonzero, n is even, $|a_1| = |a_3| = \dots = |a_{n-1}|$, $|a_2| = |a_4| = \dots = |a_n|$ and $|a_1| \neq |a_2|$. Finally, we give a criterion for A to be reducible and completely characterize the numerical ranges of such matrices.

Tea Break: 15:20-15:35

Lecture Five: 15:35-16:25 (Chair: Professor Jin Liang)

Speaker: Dr. Ming-Hsiu Hsu

Title: Inner products and module maps of Hilbert C^* -modules

Abstract: Let E and F be two Hilbert C^* -modules over C^* -algebras A and B , respectively. Let T be a surjective linear isometry from E onto F . We will discuss in this paper that if the C^* -algebras A and B are commutative, then T preserves the inner products and T is a module map,

i.e., there exists a $*$ -isomorphism ϕ from A onto B such that $\langle Tx, Ty \rangle = \alpha(\langle x, y \rangle)$, and

$T(xa) = T(x)\alpha(a)$. In case A or B is noncommutative C^* -algebra, T might not satisfy the equations above in general. However, if T is a 2-isometry between full Hilbert C^* -modules, then T preserves the inner products and is a module map.

Lecture Six: 16:30-17:20 (Chair: Professor Hong-Kun Xu)

Speaker: Professor Wataru Takahashi

Title: Fixed Point and Ergodic Theorems without Convexity and Some Related Topics

Abstract: We introduce the concept of attractive points of a nonlinear mapping in a Hilbert space and a Banach space. Then we obtain some fundamental properties for the points. Using these results, we prove attractive point and mean convergence theorems without convexity for a class of nonlinear mappings which contain the class of nonexpansive mappings. These results generalize well-known fixed point theorems and nonlinear ergodic theorems. We also obtain some results which related to attractive points.