

2013 分析研討會議程

11 月 29 日 (星期五)

14:30-15:00 報到

Session 1

15:00-15:50 方向〈中央大學〉

A generalization of composition operators on the Bergman space via quasiconformal mappings

15:50-16:10 — Tea Break —

16:10-17:00 張耀祖〈義守大學〉

Algebraic decoding of cyclic codes

18:00-20:00 晚宴

11 月 30 日 (星期六)

Session 2

9:20-10:10 姚任之〈高雄醫學大學〉

Lower semicontinuity of the solution set to a parametric optimal control problem

10:10-10:30 — Tea Break —

10:30-11:20 沈俊嚴〈中央大學〉

Sums, products and their variants

11:20-12:10 王昆淥〈東華大學〉

Wavelets, function spaces and operators

Session 3

14:00-14:50 徐洪坤〈中山大學〉

Introduction to compressed sensing

14:50-15:40 黃皇男〈東海大學〉

Optimal inventory control in a failure-prone manufacturing system

15:40-16:00 — Tea Break —

16:00-16:50 黃毅青〈中山大學〉

Classification of C^* -algebras into types

16:50-17:40 李沖〈浙江大學〉

Approximate solutions for abstract inequality systems

A GENERALIZATION OF COMPOSITION OPERATORS ON THE BERGMAN SPACE VIA QUASICONFORMAL MAPPINGS

XIANG FANG
NATIONAL CENTRAL UNIVERSITY

ABSTRACT. Operator theory has a rich history of interaction with function theory, but it is mostly related to analytic functions. In this talk, we report an attempt to introduce more real-variable methods into this operator-theory-function-theory interaction. We choose to work with quasiconformal mappings since it provides a good stepping stone between real and analytic functions, and more general real functions are possible for the next step. We choose to work with the Bergman space since it appears more natural, but our next step is probably to take on the Hardy space and the Dirichlet space.

ALGEBRAIC DECODING OF CYCLIC CODES

YAOTSU CHANG
I-SHOU UNIVERSITY

ABSTRACT. The concept of error-correcting coding was invented by Richard Hamming in 1940's to protect the transmitted data in data transmission over noisy communication channel. Applications of error-correcting codes includes digital audio/video, deep space communication, data storage, fiber optics, and so on.

Among those error-correcting codes, cyclic codes, proposed and identified with ideals of rings by E. Prange in 1957, are important practical ones and have been the focus of interest to both mathematicians and engineers. In addition, cyclic codes are widely used today. However, besides certain special families, including Golay, Bose-Chaudhuri-Hocquenghem (BCH), and Reed-Solomon codes, there are no practical decoders for arbitrary cyclic codes.

Based on the Lagrange interpolation formula and multivariate interpolation formula, a practical decoding scheme for arbitrary cyclic codes is developed and will be presented in this talk.

- This is a joint work with Chong-Dao Lee.

LOWER SEMICONTINUITY OF THE SOLUTION SET TO A PARAMETRIC OPTIMAL CONTROL PROBLEM

JEN-CHIH YAO
KAOHSIUNG MEDICAL UNIVERSITY

ABSTRACT. This talk studies the solution stability of a parametric optimal control problem with linear state equation, control constraints and convex cost functions. By reducing the problem to a parametric programming problem and a parametric variational inequality, we obtain the lower semicontinuity of the solution map to a parametric optimal control problem.

SUMS, PRODUCTS AND THEIR VARIANTS

CHUN-YEN SHEN
NATIONAL CENTRAL UNIVERSITY

ABSTRACT. We introduce the expanding phenomena in finite fields by considering addition and multiplication of numbers. This type of problems has been studied since the well-known theorem of Bourgain-Katz-Tao was proven. It also has been found lots of important applications in various areas, such as analytic number theory and combinatorial geometry e.t.c. In this talk, we will briefly review the history of this subject, report its recent progress and discuss how Fourier analysis plays an important role in attacking these problems.

WAVELETS, FUNCTION SPACES AND OPERATORS

KUN CHUAN WANG
NATIONAL DONG HWA UNIVERSITY

ABSTRACT. There are three folds in this talk. We first will introduce wavelet theory in a more general sense, then, from these expansions, we define some function spaces, for example, Triebel-Lizorkin spaces, Besov spaces, and Carleson measure spaces, which include classical functions such as L^p , Hardy spaces and Sobolev spaces. Finally we give some example of linear operators to show that some necessary and sufficient conditions follow from these type of operators.

INTRODUCTION TO COMPRESSED SENSING

HONG-KUN XU
NATIONAL SUN YAT-SEN UNIVERSITY

ABSTRACT. In digital signal processing, a signal of interest is reconstructed from linearly measured data, and traditionally, the Nyquist rate must be applied, which is at least two times faster than its bandwidth—this is the famous Shannon-Nyquist sampling theorem. However, the Nyquist rate would produce the data too big to get stored. Compressed sensing (CS) provides a revolutionary change in data acquisition. It recovers a signal of N unknown entries by making far fewer than N measurements. The success of CS is due to the sparse representation of the signal in terms of an appropriate basis. Various optimization techniques can be used to recover the signal. In this talk we will introduce the mathematical basics of this fascinating area of applied mathematics, including under-determined linear systems and optimization methods such as the lasso and the basis pursuit (BP).

OPTIMAL INVENTORY CONTROL IN A FAILURE-PRONE MANUFACTURING SYSTEM

HUANG-NAN HUANG
TUNGSHAI UNIVERSITY

ABSTRACT. A flexible manufacturing system producing a single commodity is considered here. It is assumed that there is a constant demand rate and the machines are parallel connected in the manufacturing system which may subject to two states: breakdown state due to failure or functional state for normal operation. The failure behavior of the system is formulated by the birth-death Markov process to describe the variation of production capability. Developing the optimal control policy for the production plan of manufacturing systems has been studied over many decades since 1950's. In this talk, we review the development of the production control problem of this type of manufacturing system to maintain the minimal overall production cost.

The optimal policy of production plan for a single commodity in a failure-prone parallel machine system is fulfilled by solving the corresponding Hamilton-Jacobi-Bellman (HJB) equation. The system is assumed to possess two-level of operation capacity and the surplus holding cost is a monomial function. Under these assumption, the analytical method based on Akella and Kumar (1986) is developed to solve HJB equation using the derived boundary conditions of the value function. The effect of different operating parameters, such as failure rate, repair rate, maximal capacity level, et. al., on the optimal inventory level and the value function are numerical computed by using our analytical formula. For an arbitrary hold cost with the analytical or empirical formula which can be approximated by the sum of monomial functions, thus this paper provides a way to construct the corresponding optimal production plan. The higher the holding cost is applied the higher optimal inventory level and minimal overall cost are presented as well. When the inventory level operates away from its optimal one, the total cost will increase accordingly and the increment for cubic surplus holding cost is larger than the linear and quadratic holding costs. The effect of parameter variation on the optimal inventory level and total cost is intuitively consistent.

CLASSIFICATION OF C^* -ALGEBRAS INTO TYPES

NGAI-CHING WONG
NATIONAL SUN YAT-SEN UNIVERSITY

ABSTRACT. It is great success of Murray and von Neumann in classifying W^* -algebras into types I, II, III, finite, semifinite, \dots . Every W^* -algebra can be written uniquely as a direct sum 5 disjoint ideal, each of them is of finite type I, infinite type I, finite type II, infinite type II, and (always infinite) type III. The types reflect the property of its projections.

However, a C^* -algebra might have no nontrivial projection. This makes the classification scheme of Murray and von Neumann cannot translated vebatim. There are many attempts of operator algebraists for a complete classification scheme of C^* -algebras. In this talk, I will present some examples. Most recently, Chi-Keung Ng of Nankai and the speaker obtained a new complete scheme to deompose a general C^* -algebras into a diectr sum of five disjoint types.

APPROXIMATE SOLUTIONS FOR ABSTRACT INEQUALITY SYSTEMS

CHONG LI
ZHEJIANG UNIVERSITY

ABSTRACT. We consider the conic inequality systems of the type: $F(x) \geq_K 0$ with approximate solution x_0 associated to a parameter τ , where F is a twice Fréchet differentiable function between Hilbert spaces X and Y , and \geq_K is the partial order in Y defined by a nonempty convex (not necessarily closed) cone $K \subseteq Y$. We prove that, under the suitable conditions, the system $F(x) \geq_K 0$ is solvable and the ratio of the distance from x_0 to the solution set S over the distance from $F(x_0)$ to the cone K has an upper bound given explicitly in terms of τ and x_0 . We show that the upper bound is sharp. Application to analytic function inequality/equality systems on Euclidean spaces are given, and the corresponding results of Dedieu [SIAM J. Optim. **11** (2000), 411-425] are extended and significantly improved.