CHAPTER 31

MATHEMATICAL SCIENCES
MATHEMATICS

Doctoral Theses

398. ARORA (Ruchi)
On constrained Set Valued of Optimization : Proper Efficiency, Conjugate Duality and Epiderivatives.
Supervisors : Dr. C. S Lalitha and Prof. B K Dass
Th 16726

Abstract

Introduces the notion of proximal proper minimizer for a closed set and subsequently analyses its relation with certain well known notions of proper minimizers. Two new notions of generalized convexity for set-valued maps namely, cone semilocal convexity and cone semilocal convexlikeness, are proposed. Concentrates on deriving an optimality criterion in terms of generalized epiderivatives of the set-valued maps. Deals with the optimality criterion of the constrained set-valued optimization problem (VP) in terms of proper Clarke epiderivative. Presents conjugate duality for an unconstrained set-valued optimization problem.

Contents

1. Introduction. 2. Promimal proper efficiency in set-valued optimization. 3. Generalized Clarke epiderivative in set-valued optimization. 4. Conjugate duality in set-valued optimization. Bibliography.

399. BHOLA (Jyoti)
Generalized Slant Hankel Operators.
Supervisor : Prof. S. C. Arora
Th 16868

Abstract

Studies various classes of bounded linear operators on a Hilber space which generalize Slant Hankel operators. On one hand, generalizes the notion of Slant Hankel operators to kth-order slant Hankel operators (where $k \geq 2$ is an integer), while on the other hand introduces the classes of essentially slant Toeplitz operators and essentially Slant Hankel operators ont he space L^2. the study is further carried to compression fo these oeprators ont he space H^2. Also generalizes the notion of λ-Hankel operators ont he space H^2.

Contents

400. GARG (Poonam)
On the Error Control Capabilities of Repeated Burst Error Detecting/Correcting Codes.
Supervisor : Prof. B. K. Dass
Th 16720

Abstract

Deals with bounds over number of parity-check digit for linear codes detecting and correcting repeated bursts of length b(fixed). Further, codes detecting and correcting repeated low-density bursts of length b(fixed) with weight w or less have been studied.

Contents

401. SHANTHA (K. V.)
Some Aspects of Locally Convex Modules Over a Locally Convex Algebra.
Supervisor : Prof. P. K. Jain
Th 16723

Abstract

Studies locally convex spaces which are modules over locally convex algebras. These are introduced as the appropriate setting for the study of various aspect in locally convex modules over locally convex algebras. Some of the aspects are : (i) A study of various types of approximates units, approximate identities in the locally convex algebra for the locally convex modules and their inter relationship. (ii) Locally convex essential modules and their multiplier modules. (iii) Strict topology induced on a locally convex module by the locally convex algebra. (iv) Strict topology induced on a locally convex bimodule over locally convex algebras.

Contents

402. SHARMA (Anuradha)
Some Aspects of Multilevel and Integer Programming Problems.
Supervisor : Dr. S. R. Arora
Th 16869

Abstract

Studyies various aspect of multilevel and integer programming problems. Presents a brief introduction, background and practical importance of Mathematical Programming (MP). Discusses the Non-Linear and Fractional Multilevel Programs.

Contents

403. SINGH (Hemant Kumar)
On the Cohomological Structure of Orbit Spaces of Certain Transformation Groups.
Supervisor : Prof. Tej Bahadur Singh
Th 16721

Abstract

Describes topological transformation group. Gives some basic definitions and results relating to the fibre bundle theory. Discusses CW complexes and give homology and cohomology groups of some important CW complexes. Discusses a special class of fibre bundle whose fibers are spheres of a fixed dimension. For such bundles, introduces the concept of orientable bundle and define the Euler characteristic class for an orientable sphere bundle. Also derive an exact sequence called the Thom-Gysin sequence which connects the cohomology of the total space of an orientable bundle with that of its base space. Also introduces the cohomology spectral sequence and relate the right structure on cohomology and the spectral sequence. The right structure makes the cohomology spectral sequence a much more powerful computational tool than the homology spectral sequence. Determines the mod 2 cohomology ring of the orbit space of a fixed point free Z_2 and S^1 actions on a cohomology real projective space X. Obtains some Borsuk-Ulam type results by using the results of section 5.4 together with some basic facts on characteristic classes. If $\eta \rightarrow X$ is a real vector bundle, we wirte $\omega_i(\eta)$ to denote its *i-th* Stiefel-Whitney classes.

Contents

404. SINGH (Prempal)
Non Linear Dynamical Systems and Chaos Synchronization.
Supervisors : Dr. Ayub Khan and Prof. R. K. Mohanty
Th 16725

Abstract

Studies chaos synchoronization of two identical nonlinear dynamical systems. On one hand it generalizes the concept of chaos synchronization by introducing some feedback control laws, while on the other hand, verifies proposed control laws by synchronization of chaotic systems. Describes the formulation of chaotic systems in a systematic manner. Also generalizes feedback control laws including the upper bounds of drive system only.

Contents

1. Introduction. 2. Synchronization criterion of nonlinear dynamical system. 3. Adaptive feedback synchronization. 4. Generalized adaptive feedback synchronization. 5. Chaos synchronization via linear state error feedback control. 6. Open problem. References.

405. TAHILIANI (Sanjay)
β-Open Sets in General Topology.
Supervisor : Prof. S. C. Arora
Th 16724

Abstract

Investigates four classes of functions related to β–Open sets. These classes are termed as (i) almost strongly θ-β-continuous functions (ii) almost β–continuous functions (iii) contra almost β–continuous functions and (iv) the class of slightly β–continuous functions. It has been observed that the class of almost β–continuous functions. Studies generalized β–closed sets and introduce generalized β–closed functions and obtain some more characterization of β–regular and β–normal spaces and also study gβ–regular and gβ–normal spaces. Focuses to introduce and study an operation γ on a family of β–Open sets in a topological space (X,τ). Introduces the notion of weakly β–continuous functions and almost β–continuous functions in bitopological spaces and obtain their characterizations.

Contents

1. Introduction. 2. β–Open sets and separation axioms. 3. β–Open sets and functions. 4. Generalizing β–Open sets. 5. Operational approach and applications. 6. Weakly β–Continuous functions in bitopological spaces. References.

406. TEHRI (Roopesh)
Studies on Chaos Control and Chaos Indicators in Dynamical Systems.
Supervisors : Prof. R. K. Mohanty and Dr. L. M. Saha
Th 16867

Abstract

Studies the control of chaos in buckled elastic beam. Intially shows that chaotic motion of buckled elastic beam can be

controlled by periodic parametric perturbation in the nonlinear term. Investigates the synchronization and anti-synchronization of continuous dynamical systems by using active control theory. Discusses three types of indicators of chaos and regularity : the Fast Lyapunov Indicator (FLI), the Smaller Alignment Index (SALI) and a new type of indicator, called the Dynamic Lyapunov Indicator (DLI).

Contents

1. Introduction. 2. Chaos control by periodic parametric perturbation technique. 3. Synchronization and anti-synchronization of chaos using active control method. 4. Chaos indicators and its application to various two dimensional discrete map. 5. Evolutionary behaviour in certain two dimensional discrete maps with the use of chaos indicators. Bibliography.

407. VERMA (Rashmi)
Study of Repeated Burst Error Detecting and Correcting Codes.
Supervisor : Prof. B. K. Dass
Th 16722

Abstract

Deals with the study of codes that can detect and correct repeated bursts. The investigations on bounds on the number of parity-check digit required for linear codes capable of detecting and correcting repeated bursts. Further, repeated low-density bursts of lingth b or less with weight w or less detecting and correcting codes have been studied.

Contents

1. Introduction. 2. Repeated burst error detecting linear codes. 2. Repeated burst error correcting linear codes. 4. Repeated low-density burst error detecting linear codes. 5. 2-repeated low-density burst error correcting linear codes. Bibliography.

M.Phil Dissertations

408. AGGARWAL (Mukesh)
Properties of Uniformly Starlike and Uniformly Convex Functions.
Supervisor : Dr. V. Ravichandran

409. AGGRAWAL (Tanu)
Study of Convolutional Codes and Its Applications.
Supervisor : Prof. Sapna Jain

410. AGRAWAL (Neha)
Frames of Subspaces.
Supervisor : Dr. Pawan Bala

411. BANSAL (Ashish)
Hardy's Uncertainty Principle on Nilpotent Lie Groups.
Supervisor : Prof. Ajay Kumar

412. CHANDRASHEKHAR
Some Extensions of Rademacher's Theorem to Banach Spaces.
Supervisor : Dr. R. Panda

413. CHANDRASHEKHAR
Sufficient Conditions for Univalency, Starlikeness and Convexity of Analytic Functions.
Supervisor : Dr. V. Ravichandran

414. DHAWAN (Vishal)
Invariant Subspaces of Composition Operators.
Supervisor : Prof. S. C. Arora

415. DHINGRA (Mansi)
Weak Sharp Minima for Optimization and Variational Inequality Problems.
Supervisor : Dr. C. S. Lalitha

416. GARG (Honey)
On Codes Over Z_4.
Supervisor : Prof. Sapna Jain

417. IBRAHEEM (Aysha)
Prime Ideals and Its Generalizations in Some Algebraic Structures.
Supervisor : Prof. Vishnu Gupta

418. KOHLI (Teena)
Essential Norms of Composition Operators.
Supervisor : Prof. S. C. Arora

419. NAGPAL (Sumit)
First and Second Order Differential Subordinations and Redius Problems for Caratheodary Functions.
Supervisor : Dr. V. Ravichandran

420. PRASAD (Ram Pravesh)
On Finite Difference Schemes for a Class of Hyperbolic Partial Differential Equations.
Supervisor : Dr. Urvashi Arora

421. RANJAN (Amitabh Gyan)
Some Aspects on Q-Ideals, Jacobson Radical, Maximal k-Ideals and Direct Sums of Semirings.
Supervisor : Dr. S. K. Bhambri

422. TALWAR (Jyoti)
Alternating Group Explicit Methods for the Solution of Non-Linear Differential Equations With Singular Coefficients.
Supervisor : Prof. R. K. Mohanty

423. VANDANA
Approximate Identities and Ideals in Banach Algebras.
Supervisor : Prof. Ajay Kumar