CHAPTER 29

MATHEMATICAL SCIENCES MATHEMATICS

Doctoral Theses

 383. ANURADHA
 Quasi- Ideals, Bi- Ideals and Weakly Prime Ideas in Ternary Semirings.
 Supervisor : Dr. S. K. Bhambri Th 18927

Abstract

Compiles the fundamental notions and propositions on ternary semirings. Introduces the notions of (m, (p,q), n)-Quasi-ideals and (m, (p,q), n)-Bi-ideals in ternary semirings and give their examples. Also analysis some standard properties related to the same. Studies the concept of minimal quasi-ideals in ternary semiring and prove some standard results analogous to ring theory. Studies the notion of minimal bi-ideals in ternary semirings and find the relation in terms of regular ternary semirings. Introduces the notions of prime and semiprime quasi-ideals in ternary semirings and some relevant counter examples are also indicated. Also introduces the notion of S-prime quasi-ideal and some results related to the same have been discussed.

Contents

1. Preliminaries. 2. (m, (p,q), n)-Quasi-ideals and (m, (p,q), n)-Bi-ideals. 3. Quasi-ideals and regularity. 4. Bi-ideals and regularity. 5. Prime and weakly prime left ideals. 6. Prime Quasiideals in ternary semirings. References.

384. ARYA (Chaman Prakash) On Some Generalizations of Continuity of Multifunctions. Supervisors : Dr. J. K. Kohli and Dr. R. Panda Th 19100

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Abstract

Studies notions of strong continuity of Levine and perfect continuity due to Noiri are extended to the framework of multifunctions and their basic properties. Extends the notion of cl-supercontinuity to the realm of multifunctions. The notion of almost cl-supercontinuity to the framework of multifunctions and the notion of quasi cl-supercontinuity of functions to the realm of multifunctions

Contents

 Introduction. 2. Strongly and perfectly continous multifunctions.
 Upper and lower cl-supercontinous multifunctions. 4. Upper (lower) almost cl-supercontinous multifunctions. 5. Upper (lower) quasi cl-supercontinous multifunctions. Bibliography.

385. BHATIA (Meetu) Some Aspects of Optimality and Duality in Vector Optimization. Supervisor : Dr. Surjeet Kaur Suneja <u>Th 18928</u>

Abstract

Studies certain optimality and duality aspects in vector optimization. Discusses some important generalizations of convex functions over cones and study optimality conditions and duality results for vector optimization problems. Studies higher order optimality and duality results for optimization problems. Introduces higher order convex, higher order cone pseudoconvex, higher order strongly cone pseudoconvex and higher order cone quasiconvex functions.

Contents

1. Introduction. 2. Cone convex and related functions in vector optimization. 3. Second order symmetric duality in vector optimization. 4. Higher order optimality and duality in vector optimization. Scope for futher research. References.

386. DHALL (Deepika)

HIgh Accuracy Numerical Methods for the Solution of Nonlinear Boundary Value Problems. Supervisor : Prof. R. K. Mohanty Th 18929

Abstract

Discusses some formal methematical concepts required to develop highly accurate numerical schemes for the solutions of boundary value problems. Presents a new three point variable mesh method of accuracy (h_1^3) for the solution of second - order nonlinear ordinary integro-differential equations with homogeneous functions in integral from subject to natural boundary conditions. Discusses a new numerical methods of accuracy of O(h³) based on arithmetic average discretizations for the solution of the nonlinear integro-differential equation subject to essential boundary conditations. Developes a third order variable mesh method based on Numerov type discretization. Reports a new nine point compact discretization of order two in y- and order four in x-directions, based on cubic spline approximation for the solution of two dimensional guasi-linear elliptic partial differential equations and describes how discretization is able to handle Poisson's equation in polar coordinates using nine-point compact stencil, discusses a new Numerov type stable method on a variable mesh based on cubic spline approximations for the solution of two-dimensional nonlinear elliptic boundary value problems subject to Dirichlet boundary conditions.

Contents

1. Introduction. 2. Third order accurate variable mesh discretization and application of TAGE iterative method for non-lenear two-point boundary value problems. 3. A cubic spline approximation and application of TAGE iterative method for the solution of two-point boundary value problems. 4. High Accuracy arithmetic average discretization for Non-linear two point boundary value problems. 5. High accuracy cubic spline approximation for two dimensional quasi-liner elliptic boundary value problems. 6. A stable high accuracy cubic spline approximation for two dimensional non-linear elliptic boundary value problems on a geometric mesh. 7. Conclusion and suggestions for further research work. References.

387. SINGH (Suruchi nee Suruchi) Class of Efficient Finite Difference Discretization for the Solution of Second Order Quasi-linear Hyperbolic Equations. Supervisor : Prof. R. K. Mohanty Th 19099

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Abstract

Considers one-space dimensional guasi-lenear hyperbolic partial differential equation. Studies a new three-level implicit compact finite difference discretization of $O(k^2 + k^2h^2 + h^4)$, based on cubic spline approximation, for the solution of one-space dimensional second order quasi-linear hyperbolic partial differential equations. Purposes two new three-level implicit methods of $O(k^2 + k^2h_1 + h_1^3)$ one based on Numerov type compact discretization and the other based on cubic spline approximation on a non-uniform mesh for the solution of one-space dimensional non-linear hyperbolic partial differential equation.

Contents

1. Basic. Mathematical concepts and introduction to finite difference method. 2. High accuracy numerav type discretization for the solution of one-space dimensional guasi-linear hyperbolic equations. 3. A new high order approximation for the solution of two-space dimensional guasi-linear hyperbolic equations. 4. A new high order approximation for the solution of three-space dimensional quasi-linear hyperbolic equations. 5. A new three-level implicit cubic spline method for the solution of 1D quasi-linear hyperbolic equations. 6. High order variable mesh approximations for the solution of 1D non-linear hyperbolic equations. 7. Conclusion and suggestion for further research work. References.

388. **UPRETI** (Priti)

On Some Generalized Orlicz Type Spaces.

Supervisors : Dr. Pawan K. Jain and Dr. Pankaj Jain Th 18930

Abstract

Studies a unification of the spaces L_{ϕ} and X^{p} , to be denoted by X . Focuses on the Orlicz spaces generated by G-functions. Such spaces are denoted by L_G. The inclusion relation between L_Gspaces is studied. Studies the product of $X_{\mbox{\tiny Φ}}$, spaces. Two types of products are discussed namely, $X_{\phi_1} \odot X_{\phi_2}$ and $X_{\phi_1} \otimes X_{\phi_2}$.

Contents

1. Preminaries and historical background. 2. Inequalities and properties of some generalized orlicz classes and spaces. 3.

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Further properties of generalized orlicz spaces. 4. Imbedding and Sobolev type inequality of generalized orlicz spaces. 5. On product of generalized orlicz spaces. 6. On product of victor valued orlicz spaces. References.

M.Phil Dissertations

- 389. AGARWAL (Reema)
 Radical Formulae for Submodules and Rings Satisfying the Radical Formula.
 Supervisor : Dr. Atul Gaur
- BRAHMA PRAKASH
 Study of Some Problems on the Motion of a Gas Bubble in an Incompressible Fluid.
 Supervisor : Dr. Dinesh Khattar
- 391. KHUSHBOO Optimization Reformulations and Computational Methods of Generalized Nash Equilibrium Problems. Supervisor : Dr. C. S. Lalitha
- 392. NEELESH KUMAR
 Finite Difference Schemes for a Class of Elliptic Boundary
 Value Problems.
 Supervisor : Dr. Swarn Singh
- 393. RATHI (Poonam)
 Spectral Synthesis for Banach Algebras. Supervisor : Prof. Ajay Kumar
- 394. SONIA Strongly Prime Group Rings. Supervisor : Dr. Kanchan Joshi
- 395. TAHIR NADEEM Study of Shock Waves in Gases. Supervisor : Dr. Arvind Patel