CHAPTER 29

MATHEMATICAL SCIENCES
MATHEMATICS

Doctoral Theses

287. LALIT KUMAR
Study of Frames in Banach Spaces.
Supervisor : Prof. Pawan K. Jain
Th 15349

Abstract

Studies and enhances frames for Banach spaces. Show that Banach Bessel sequences are stable under small perturbation of Banach Bessel sequence elements. A necessary and sufficient condition for a sequence in a Banach space to be a retro Banach frame for its conjugate space has been given.

Contents

1. Historic background 2. Prerequisites 3. Banach bessel sequence and banach frames in Banach spaces 4. Perturbation of Banach frames 5. Stability of Banach frames 6. Retro Banach frames for conjugate Banach spaces and bibliography.

288. RAVI SHANKER
Various Techniques for Solving Non-Liner Set-Covering Problem
Supervisor : Dr. S. R. Arora
Th 15348

Abstract

Deals with the class of optimization problems with linear and non-linear, single and multi-objective functions. An algorithm to solve a multi-objective set covering problem with quadratic objective functions is discussed. It is based on a Goal programming approach with Non-Linear objectives under pre-emptive priority structure. The objective functions of the Multi-Objective Quadratic Set Covering are considered as distinct goals. In this approach, the feasible region of the decision variables are generated first and then the attainment of these objectives are

considered. Then the formulation of Goal Programming Problem equivalent to a Set-Covering Problem is discussed.

Contents

1. Introduction. 2. Nin-Linear set covering problem 3. Non-Linear set covering problem : A goal programming approach 4. Set covering and set partitioning problem : A combinatorial approach and References.

289. SWARN SINGH

New Highly Accurate Discretization for the Solution and the Estimates of for SIngularly Perturbed Non-Linear Multi-Dimensional Elliptic and Parabolic Partial Differential Equations.

Supervisors : Dr. R.K. Mohanty

Th 15347

Abstract

Proposes highly accurate finite difference methods based on arithmetic average discretization for the numerical solution of multidimensional non-linear ellipic and parabolic partial differential equations and estimates of ($\delta u/\delta n$) using a single computational cell, which are quite often of interest in many applied problems. When grid lines are parallel to coordinate axes, then ($\delta u/\delta n$) becomes ($\delta u/\delta x$) , ($\delta u/\delta y$) and ($\delta u/\delta z$) and hence represents tangential or normal derivatives.

Contents

1. Theoretical background and difference methods for elliptic and parabolic partial differential equations 2. Third order variable mesh arithmetic average discretization for the solution of singularly perturbed two point Non-Linear boundary value problems 3. Arithmetic average discretization of $O(h^4)$ for singularly perturbed two-dimentional Non-Linear elliptic boundary value problems 4. Arithmetic average discretization of $O(h^4)$ for three dimensional singularly perturbed Non-Linear elliptic partial differential equations 5. Non-Uniform mesh arithmetic average discretization for space dimentional Non-Linear parabolic initial boundary value problems 6. A new two level implicit discretization of $0(k^2+kh^2+h^4)$ for singularly perturbed two space dimentional Non-Linear parabolic partial differential equations 7. A new high order two-level implicit discretization for the perturbed three space dimentional Non-Linear parabolic equations 8. Conclusions and scope for future research work and Bibliography.