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**BEST PROXIMITY AND COUPLED BEST PROXIMITY POINTS OF
($\psi - \varphi - \theta$)-ALMOST WEAKLY CONTRACTIVE MAPS IN PARTIALLY
ORDERED METRIC SPACES**

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In this paper we obtain some best proximity point results using almost contractive condition with three control functions (in which two of them need not be continuous) in partially ordered metric spaces. As an application, we prove coupled best proximity theorems. The results presented in this paper generalize the results of Choudhury, Metiya, Postolache and Konar [1]. We draw several corollaries and give illustrative examples to demonstrate the validity of our results.

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T*-GENERALIZED CLOSED SETS IN TOPOLOGICAL ORDERED SPACES

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In this paper, we introduce a new class of sets called increasing T*-generalized closed sets, decreasing T*-generalized closed sets and balanced T*-generalized closed sets in topological ordered spaces and study some of their properties. In this paper we proved some relations among Increasing T*-generalized closed sets with other closed type sets in topological ordered spaces. In a similar manner we proved for decreasing and balanced type sets.

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POST ALMOST DISTRIBUTIVE LATTICES

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A complete list of all closed classes of Boolean functions was first given by Emil Post in 1941, see [4]. This list of closed classes of Boolean functions is nowadays called "Posts". Moreover, Emil Post proved that each of them has a finite basis and he obtained a list of bases for all closed classes [3]. Later on, G. Epstein, T. Traczyk and Ph. Dwinger developed the concept of Post algebra, see [2]. Thus, the Post lattice has become a useful tool in complexity which examines the Boolean circuits and propositional formulas. The Post lattice can be a very helpful tool for complexity studies in Boolean circuits and propositional formulas. The Boolean circuits and Boolean functions attract and deserve a lot of attention in theoretical computer science, and the theory behind them is exhaustively used in circuit design and various other important fields. The mathematical operations that correspond to the operations carried out when soldering the Boolean circuits. While studying the properties of Post algebra, G. Epstein introduced the concepts of P2-lattices and P2-lattices [7] which are interesting in computer science. These two kinds of lattices can be applied to the theory



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of machines with multi-stable devices. The P2-lattices provide the complete multiple-valued logics. In 1981, U.M. Swamy and G.C. Rao [16] introduced the concept of an “Almost Distributive Lattice” (or, in brevity simply write ADL) as a common abstraction of most of the existing ring theoretic and lattice theoretic generalizations of a Boolean algebra. The theory of ADL has many applications in chemistry, applied chemistry, botany, automata theory, cryptography and modeling. In this paper, we derive the properties of a P2-almost distributive lattice[7] and also we prove that the class of P2-almost distributive lattices as well as Post almost distributive lattices are equationally definable [7]. These properties will help further investigations of possible applications of Post almost distributive lattice in logic and computer science.

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MONOMIAL THEOREM (NEW APPROACH)

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Definition : Any nth power of the base can be equated into limitless terms.

Features :

- 1) There are four kinds in M.T.
- 2) Every kind contains A.O., D.O.1, D.O.2., and D.O.3 only.
- 3) M.T. produces identities. Every identity gives equations.
- 4) Base can be integral, fraction, Zero or surd no problem seems.
- 5) Base can be either increased, decreased, or equaled in expression side.
- 6) Herein no limit to terms.
- 7) Identity gives scope to produce another identity.

Identity : $B^{10} = 1(B+2)^2(B-2)^8 + 12(B+2)^2(B-2)^7 + 68(B+2)^2(B-2)^6 + 224(B+2)^2(B-2)^5 + 480(B+2)^2(B-2)^4 + 640(B+2)^2(B-2)^3 + 640(B+2)^2(B-2)^2 + 0(B+2)^2(B-2)^1 + 1280(B+2)^2 - 5120(B+2)^1 + 1024$ (in 9 terms)

For example : $5^{10} = 1(1 \times 3 + 12 \times 3 + 68 \times 3 + 224 \times 3 + 480 \times 3 + 640 \times 3 + 640 \times 3 + 0 \times 3 + 1280) (7)^2 - 5120(7)^1 + 1024 = 9765625$ (For calculations use only)

Equation : $5^{10} = (1(3)^8 + 12(3)^7 + 68(3)^6 + 224(3)^5 + 480(3)^4 + 640(3)^3 + 640(3)^2 + 0(3)^1 + 1280) (7)^2 - 5120(7)^1 + 1024$

MODIFIED HOLOGRAPHIC RICCI DARK ENERGY MODEL IN A SCALAR TENSOR THEORY OF GRAVITATION

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In this paper we have studied homogenous and anisotropic Bianchi type-V metric filled with Dark matter and Modified Holographic Ricci Dark Energy (MHRDE) in the frame-work of scalar-tensor theory of Gravitation proposed by Saez Ballester. To find a deterministic solution for Saez-Ballester field equations we have used (i) the hybrid expansion law (HEL) for the average scale factor $R(t) = (t \text{let})1=k$, which yields a time dependent deceleration parameter and exhibits a transition of the Universe from early decelerated phase to the recent accelerating phase (ii) the scalar expansion is proportional to the shear scalar. We have investigated the physical and geometrical properties of the model.

Key words: Bianchi type-V metric, Saez-Ballester theory, Hybrid expansion law, Holographic Ricci Dark Energy



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**RADIUS AND DIAMETER OF FAMILIES OF GRAPHS
W.R.T. VERTEX-TO-EDGE D-DISTANCE**

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The D-distance between vertices of a graph is obtained by considering the path lengths as well as the degrees of vertices present on the path. This can be extended, in a natural manner, to a distance between vertices and edges. In this article, we study the radius and diameter of some families of graphs with respect to vertex-to-edge D-distance.

ON β -FILTERS OF STONE ALMOST DISTRIBUTIVE LATTICES

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Introduced the notions of boosters and β -filters in stone Almost Distributive Lattices and study their properties. Boosters are utilized to characterize the β -filters. Derived that every proper β -filter is the intersection of all prime β -filters containing it and also proved that the $F_\beta(L)$ of all β -filters is isomorphic to the set of all ideals of $B_0(L)$. Finally, given a set of equivalent conditions for $B_0(L)$ to become a relatively complemented Almost Distributive Lattice.

Keywords: Almost Distributive Lattice (ADL), stone ADL, relatively complemented ADL, ideal, filter, booster, β -filters, isomorphism.

AMS Subject Classification: 06D99,06D15

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MATHEMATICAL MODELING

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This article consists of detailed explanation about mathematical modeling, and it describes the model classifications and its scope of the model in mathematics It explains about its significance and its applications in the natural sciences...

KEYWORDS: Mathematical modeling, significance, applications, model classifications

1 INTRODUCTION

A mathematical model is a description of a system using mathematical concepts and language. The process of developing a mathematical model is termed mathematical modeling. Mathematical models are used in the natural sciences (such as physics, biology, earth science, meteorology) and engineering disciplines (such as computer science, artificial intelligence), as well as in the social sciences (such as economics, psychology, sociology, political science). Physicists, engineers, statisticians, operations research analysts, and economists use mathematical models most extensively. A model may help to explain a system and to study the effects of different components, and to make predictions about behaviour. Modeling requires selecting and identifying relevant aspects of a situation in the real world.

Mathematical models can take many forms, including but not limited to dynamical systems, statistical models, differential equations, or game theoretic models. These and other types of models can overlap, with a given model involving a variety of abstract structures. In general, mathematical models may include logical models. In many cases, the quality of a scientific field depends on how well the mathematical models developed on the theoretical side agree with results of repeatable experiments. Lack of agreement between theoretical mathematical models and experimental measurements often leads to important advances as better theories are developed.

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FIXED POINTS OF GENERALIZED TAC - CONTRACTIVE MAPPINGS IN b -METRIC SPACES

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We introduce generalized TAC -contractive mappings in b -metric spaces and we prove some new fixed point results for this class of mappings. We provide examples in support of our results. Our results extend the results of Chandok, Tas and Ansri [1] from the metric space setting to b -metric spaces and generalize a result of Doric [2].

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EFFECTIVE MODEL OF PREDATOR – PREY RELATIONSHIP IN AN ECOSYSTEM USING LINEAR AND NONLINEAR SYSTEM OF DIFFERENTIAL EQUATIONS

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In many eco-systems a main carnivorous predator will have a single type of herbivorous prey as its food source. The main risk to the predators' expansion is a reduction in the supply of its food source, whereas in a fertile environment the main risk to the herbivore is a rise in the number of carnivores. These variables change over time and are interdependent. An increase in the population of carnivores will quickly lead to a decrease in the number of herbivores. If there were no carnivores then the herbivores would rapidly grow in number, whereas if there were no herbivores then the carnivores would soon die out. In a closed eco-system i.e. no migration is allowed into or out of the system, there are only two types of animals: the predator and the prey. They form a simple food-chain where the predator species hunts the prey species, while the prey grazes vegetation. The size of the two populations can be described by a simple system of two nonlinear first order differential equations i. e., the *Lotka-Volterra* equations. Such systems can be modeled rather effectively using differential equations. In ecosystems with simple food chains, this system has two critical points. One is the origin, and the other is in the first quadrant. More complex food-chains can be similarly constructed as systems of more than 2 equations. In the absence of predators, the first equation becomes the logistic equation. The prey



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population would instead stabilize at the environmental carrying capacity given by the logistic equation. In this new system there will be 3 critical points: at the origin, in the first quadrant, and the third on the positive x-axis. This third critical point is at the environmental carrying capacity of prey. Thus this paper is aimed at to explain the application of nonlinear system of differential equations in mathematical biology or ecology to model the predator-prey relationship of a simple eco-system.

Keywords: Ecosystem, Predator – prey model, Food chain, Differential equation, *Lotka-Volterra* equation, Logistic equation, Environmental carrying capacity

ORTHOGONAL DERIVATIONS ON Γ -SEMRINGS

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In this paper, we introduce the notion of orthogonal derivations on Γ -semirings. Some characterizations of semi prime Γ -semi rings are obtained by means of orthogonal derivations. And also obtained necessary and sufficient conditions for two derivations to be orthogonal.

AMS Subject Classification: 16Y60, 06F35, 08A30, 03G25.

Key words: Γ -semirings, semi prime, derivations, orthogonal derivations.

FITTING STATISTICAL LINEAR MODELS IN THE INCIDENCE OF TUBERCULOSIS

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The aim of this study was to examine the trend seasonal and geographic outcomes on tuberculosis (TB) prevalence in the Andhra Pradesh from 2008 to 2014. Information were acquired from the District TB Centre, Directorate General of Health Services, Ministry of Health and Family Welfare, Government of Andhra Pradesh, Visakhapatnam, India. The joint effects of gender, age, quarterly season and place at the TB incidence rate had been modelled using both negative binomial distribution for the number of cases and log-linear distribution for the prevalence fee, then these models had been in comparison. The linear regression models provided a good fit. The model confirmed that males and females elderly much less than 25 years had similar risks for TB within the take a look at place. Both sexes had their risk increased with age but to a much more volume for men than women, with the very best rate stated in males aged 65 years and over. The incidence has a significant season variation with peaks in the first quarter over the six year period. There have been also variations in the incidence rate of TB each within and among provinces. The log-linear regression model could be used as a easy technique for modelling TB incidence rate. These findings highlight the importance of selectively monitoring geographic location when studying TB incidence patterns.

Key words: log-linear models, negative binomial model, tuberculosis incidence.



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ABOUT FUZZY METRIC SPACES

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In this Paper we observe that Fuzzy metric spaces can also be obtained through a fuzzy norm introduced by A. K. Katsaras. In this process unlike in ordinary case we see that every fuzzy norm does not induce fuzzy metric in the sense of A. George and P. Veeramani.

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COMMON FIXED POINTS OF GENERALIZED GERAGHTY CO-CYCLIC CONTRACTIVE MAPS

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In this paper, we introduce generalized Geraghty Co-cyclic contractive maps and prove existence of common fixed point results in complete metric spaces. We deduce some corollaries from our main results and provide examples in support of our results

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MEIR KEELER TYPE CONTRACTION THROUGH RATIONAL EXPRESSION

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In this paper, we establish a new fixed point theorem for a Meir-Keeler type contraction via Gupta-Saxena's rational expression. Our result is present in this paper extend and improve the corresponding results of B.Samet et al., Najeh Redjel et al. and Dass and Gupta. Our result supported by example.

Keywords: Complete metric space. Meir-Keeler type contraction via Gupta-Saxena expression.

AMS Mathematics Classification : 47H10, 54H20.



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HOW SOFT SET THEORY IS A SPECIAL CASE OF f-SET THEORY

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The aim of this talk is: (1) to give a counter Example to show that the definition of the soft image of a soft subset under a soft map given by Kharal and Ahamad is incorrect (2) to give the correct definition of the soft image of a soft subset under a soft map.

RSA ATTACK BOUNDS

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M J. Wiener was the first one to describe an attack on the use of short RSA deciphering exponent 'd' when d is less than $N^{0.25}$, for $N=pq$ and $p < q < 2p$. Later D. Boneh, G. Durfee, J. Blomer, A. May, de Weger B, A. Nitaj and M. O. Douh improved the Wiener range of bound for d. In this paper we describe the various attacks on RSA based on the range of bound for deciphering exponent 'd' and compare the extensions of the range for the bound on d in each method.

Key words: RSA, Cryptanalysis, Continued fractions, LLL algorithm, Coppersmith's method.

FIXED POINTS OF SET-VALUED TAC-CONTRACTIVE MAPS

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In this paper we define set-valued TAC-contractive mappings and prove the existence of fixed points by using the notion of cyclic (α, β) -admissible set-valued mappings in complete metric spaces. Further, we extend it to set-valued TAC- contractive maps with rational expressions. Our results extend the results of Chandok, Tas and Ansari [1] to set-valued mappings.

Reference

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VAGUE SEMIPRIME IDEALS OF A Γ –SEMIRING

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The concept of vague semiprime ideal of a Γ -semiring with membership and non-membership functions taking values in unit interval of real numbers are introduced and obtain its various characterizations.

Key Words: Γ -semiring, regular Γ -semiring, left (resp. right) vague ideal, vague semiprime ideal.

Mathematics Subject Classification: 16Y60, 16Y99, 03E72.

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ROUGH APPROXIMATIONS OF SUBRINGS

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In 1982, Zdzislaw Pawlak introduced the theory of Rough sets to deal with the problems involving imperfect knowledge. This present research article studies some interesting properties of Rough approximations of subrings via an equivalence relation involving cosets of an ideal. In this present work, a ring structure is assigned to the universe set and a few results on the Rough approximations of subrings of the universe set are established.

AMS Subject Classification: 06B10, 16P70, 37A20, 46J20

Key Words: Ring, Subring, Ideal, Maximal Ideal, Prime Ideal, Rough set, Upper Approximation, Lower Approximation, Information system, Equivalence relation



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SECOND HANKEL DETERMINANT FOR THE CLASS OF BAZILEVIC FUNCTIONS

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The objective of this paper is to obtain a sharp upper bound to the second Hankel determinant H_2 for the function f when it belongs to the class of Bazilevic functions, using Toeplitz determinants. The results presented here include two known results as their special cases. **Keywords and phrases:** Analytic function, Bazilevic function, upper bound, second Hankel functional, positive real function, Toeplitz determinants. **2010 Mathematics Subject Classification:** 30C45; 30C50.

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THE THEORY OF ALMOST DISTRIBUTIVE LATTICES

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Since a Boolean algebra is a complemented distributive lattice, significant generalizations can be achieved either by relaxing the distributivity and retaining complementation or by retaining the distributivity and relaxing the complementation. These include the ring theoretic generalizations like regular rings, p-rings, biregular rings etc on one hand and the lattice theoretic generalizations like distributive lattices, Heyting Algebras etc on There are several lattice structures that arise through generalizations of Boolean algebras. . The class of distributive lattices has occupied a major part of the present lattice theory since lattices were abstracted from Boolean algebras through the class of distributive lattices and the class of distributive lattices has many interesting properties which lattices in general do not have. With this motivation, in 1981, Swamy and Rao introduced the concept of an Almost Distributive Lattice(ADL). This class of ADLs include almost all the existing ring theoretic generalizations of a



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Boolean algebra like p -rings, regular rings, biregular rings, associate rings, p_1 -rings, triple systems, Baer rings and m -domain rings on one hand and the distributive lattices on the other.

This concept of an ADL was introduced in the paper

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Later Dr. G. Nanaji Rao, Department of Mathematics, Andhra University, under the guidance of Prof. G. C. Rao worked on the concept of pseudo complementation in ADLs. He also introduced the concept of a Stone ADLs and worked on dense elements in ADLs. He published the following papers.

[2]. Pseudo-Complementation on Almost Distributive Lattices, Southeast Asian Bulletin of Mathematics, 24(2000) 95-104.

[3]. Stone Almost Distributive Lattices, Southeast Asian Bulletin of Mathematics, 27: 513-526(2003).

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[5]. On Characterizations of Stone Almost Distributive Lattices, Southeast Asian Bulletin of Mathematics, 32(6) (2008), 1167-1176.

DR. Ch. Pragathi, Department of Mathematics, GITAM under the guidance of Prof. U. M. Swamy worked on the Boolean centre of an ADL and published the paper.

[6]. Boolean Centre of Almost Distributive Lattices, Southeast Asian Bulletin of Mathematics, 32(5) (2008), 985-994.

[7]. Dr. S. Ravi Kumar, Department of Mathematics, M.R. College, Vijayanagaram, under the guidance of Prof. G. C. Rao worked on Normal ADLs and published the following two papers.

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Dr. M. Sambasiva Rao, Department of Mathematics, MVGR College of Engineering, Vijayanagaram under the guidance of Prof. G. C. Rao worked on the properties of α ideals, annihilator ideals, annulets in ADLs. He published the following papers.

[10]. α -ideals in Almost Distributive Lattices, Int. Journal of Contemp. Math. sciences, 4(10) (2009), 457-466.

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Dr. B. Ravi Kumar, Department of Mathematics, GITAM, Hyderabad under the guidance of Prof. G. C. Rao introduced the concept of Generalized ADLs worked on important properties of Generalized ADLs. He published the following papers.

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Dr. N. Rafi, Department of Mathematics, Bapatla Engineering college, Bapatla under the guidance of Prof. G. C. Rao worked on important properties of Normal Almost Distributive Lattices and he published the following papers

- [36]. Closure Operators in Almost Distributive Lattices, *International Mathematical Forum*, 5(19) (2010), 929-935.
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Dr. Berhanu Assaye, Department of Mathematics, Bahir Dar University, Bahir Dar, Ethiopia under the guidance of Prof. G. C. Rao worked on the properties of Heyting Almost Distributive Lattices and L-Almost Distributive Lattices. He published the following papers.

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Dr Naveen Kumar Kakumanu, K. B. N. College, Vijayawada under the guidance of Prof. G. C. Rao introduced the concepts of BL-Almost Distributive Lattices, L- Almost Distributive Lattices, pseudo supplemented Almost Distributive Lattices and worked on their properties. He published the following papers.

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Dr. Mihret Alamneh, Department of Mathematics, Bahir Dar University, Bahir Dar, Ethiopia under the guidance of Prof. G. C. Rao worked on P_1 -Almost Distributive Lattices and P_2 -Almost Distributive Lattices. He published the following papers.

- [65]. P_1 -Almost Distributive Lattices, International Journal of Mathematical Archive, .4(2),2013, 1-11
- [66]. P_2 - Almost Distributive Lattices, Journal of Global Research,1(2), Feb 2013.
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Ms. S B T Sundari Katakam, presently doing research in the Department of Mathematics, Andhra University under the guidance of Prof. G. C. Rao published the following paper as from her M. Phil work.

- [68]. Stone like Duality in Almost Distributive Lattices, Asian European Journal of Mathematics,7(3)(2014), 1450049(7 pages) .

Dr. U. Venugopalam , Lecturer in Mathematics(contract) in JNTU Vizianagaram campus under the guidance of Prof. G. C. Rao introduced the concept of Complete Almost Distributive Lattices and studied their properties. He published the following papers.

- [69]. Complete Almost Distributive Lattices, Asian European Journal of Mathematics. 7, (3)(2014), 1450052(8 pages).
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Dr. A. Lakshmana under the guidance of Dr. G. Nanaji Rao worked on Quasi Complemented Almost Distributive Lattices and he published the following papers.

- [73]. On Prime Ideal Characterization of Quasi Complemented Almost Distributive Lattices, International Journal of Mathematical Archive, Vol.5(4)(2014), 339- 344.



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Dr M. V. Ratnamani, Department of Mathematics, AITAM, Tekkali under the guidance of Prof. G. C. Rao worked on semi Heyting Almost Distributive Lattices and she published the following papers.

- [77]. Closed and Dense Elements in Semi Heyting Almost Hemi Rings, Bulletin of the International Mathematical Virtual Institute, Vol.4(2014), 97-108.
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K. Ravi Babu, lecturer in Government Degree College, Sabbavaram under the guidance of Prof. G. C. Rao is currently working on derivations in Almost Distributive Lattices. He published the following papers.

- [80]. f- derivations in Almost Distributive Lattices, International journal of Mathematical Archive, 7(5), 2016, 134-140.
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- [84]. Permuting Tri- derivations and Generalized d-derivations on Almost Distributive Lattices, Communicated to Southeast Asian Bulletin of Mathematics.
- [85]. Permuting Tri- f-derivations in Almost Distributive Lattices, Communicated to Journal of Advanced Research .

Currently work on Almost Distributive Lattices is still going on in the Department of Mathematics, Andhra University.
