Absorbent Li – Ideals of Lattice Implication Algebras

N. Srinivas, T. Anitha, V. Amarendra Babu

Abstract— on this paper we present the concept of Absorbent Li – ideal of pass section notion polynomial math L. We communicate about the relations some of the Absorbent Li – requirements toILI – beliefs, Associative Li – goals and awesome Li – desires of L. We exhibit the augmentation hypothesis of Absorbent Li – necessities and the crossing factor of Absorbent Li – dreams is additionally an Absorbent Li – best. We exhibit that the complement of Absorbent Li – first-rate is Absorbent channel. At lengthy closing we observe dubious idea to Absorbent Li – requirements and talk approximately the superb houses of hard to recognize Absorbent Li – desires.

Keywords: Li – ideals, Absorbent Li – ideal, Vague set, Lattice Implication Algebra.

I. INTRODUCTION

Amino acids are little biomolecules with a normal atomic Y. Xu [16] propounded and advanced the opportunity of Lattice suggestion variable primarily based math to analyze the practical framework. After that numerous analysts [1, 3, 12, 13, 15] doing their exploration on pass segment concept polynomial math and based the various Li – goals, inferred the few residences of those Li-convictions, to expand the idea of fluffy set, Gau and Buehrer [2] covered the few residences of those Li-convictions. to expand the opportunity of Absorbent Li – ideals is additionally an Absorbent Li – goals and evidence enrollment and towards membership. T. Anitha and V.Amarendra Babu [8, 9, 10] exercise dubious plan to absorbent Li – ideals and V.Amarendra Babu [8, 9, 10] exercise dubious plan to absorbent Li – ideals and TLI requirements and talk approximately the superb houses of hard to recognize Absorbent Li – desires.

constant of this paintings in our past papers we delivered the FLI – dreams, TLi-convictions [7, 11] of Lattice thought algebras and decided more than one places of the requirements. After that we practice the opportunity of dubious to FLI – requirements and TLi - convictions and inferred more than one homes.

in this paper we present the opportunity of Absorbent Li – impeccable of cross section notion variable based totally math L. We talk the individuals from the circle of relatives a number of the Absorbent Li – desires to ILI – convictions, Associative Li – requirements and remarkable Li – convictions of L. We display the augmentation speculation of Absorbent Li – convictions and the convergence of Absorbent Li – ideals is additionally an Absorbent Li – impeccable. We demonstrate that the complement of Absorbent Li – immaculate is Absorbent channel out. at remaining we practice unwell described idea to Absorbent Li – convictions and disk the various homes of unclear Absorbent Li – standards.

II. PRELIMINARIES

Throughout this paper L represents the lattice implication algebra, otherwise we mention.

Definition 2.1 [16]:
The complemented lattice L with universal bounds is a lattice implication algebra if it satisfies the following axioms:

(i) p → (q → r) = q → (p → r);
(ii) p → p = I;
(iii) p → q = q’ → p’;
(iv) p → q = q → p = I implies p = q;
(v) (p → q) → q = (q → p) → p;
(vi) (p ∨ q) → r = (p → r) ∧ (q → r);
(vii) (p ∧ q) → r = (p → r) ∨ (q → r).

Theorem 2.2 [16]:
Let L be a lattice implication algebra. Then for all p, q, r ∈ L, the following axioms are hold:

1. I → p = p, p → I = I.
2. p ≤ q if and only if p → q = I.
3. p → q ≤ (q → r) → (p → r).
4. ((p → q) → q) = p → q.

Definition 2.3 [11]:
A nonempty subset H of L is called a LI – ideal if 0 ∈ H and (p → q)’ ∈ H and q ∈ H implies p ∈ H for all p, q, r ∈ L.

Definition 2.4 [15]:
A nonempty subset H of L is called a ILI – ideal if 0 ∈ H and (((p → q)’ → q)’ ∈ H and r ∈ H imply (p → q)’ ∈ H.

Definition 2.5 [13]:
A nonempty subset H of L is called a Associative LI – ideal with respect to p if 0 ∈ H and ((r → q)’ → p)’ ∈ H and (q → p)’ ∈ H implies r ∈ H for all p, q, r ∈ L.

Definition 2.6 [7]:
A nonempty subset H of L is called a FLI – ideal if 0 ∈ H and ((p → r)’ → q)’ ∈ H and q ∈ H implies (((p → q)’ → p) → r)’ ∈ H for all p, q, r ∈ L.

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**Definition 2.7[6]:**
A nonempty subset F of L is called an absorbent filter if I ∈ F and (p → q) → p ∈ F implies p ∈ F for all p, q ∈ L.

**Definition 2.8[2]:**
A vague set H in the universal discourse U is characterized by two membership functions t_H and t_H with the condition t_H(p) + t_H(p) ≤ 1 where p ∈ U.
The vague set H = {p, t_H(p) + t_H(p) ≥ p ∈ U}.
The vague value of p in the set H denoted by V_H(p) is equal to t_H(p) ≤ t_H(p).

**Notation [8]:**
Let I[0, 1] signify the group of all subintervals of [0, 1]. In the event that I1 = [a, b1], I2 = [a2, b2] are two components of I[0, 1], we call I1 ≥ I2 if a1 ≥ a2 and b1 ≥ b2.
We characterize the term imax to mean the limit of two interims as

\[
\text{imax} [I_1, I_2] = \{ \max \{a_1, a_2\}, \max \{b_1, b_2\} \}
\]

**Definition 2.9:**
[2] permit A be an difficult to understand association of a universe X with fact enrollment paintings TA and the synthetic participation work fA. For any α, β ∈ [0, 1] with α ≤ β , the (α, β) – lessson or dubious cut of an ambiguous set A may be a fresh subset A(α,β) of the set X given by means of

\[
A_{\alpha, \beta} = \{ p ∈ X / V_A(p) ≥ [\alpha, \beta] \}
\]

**Definition 2.10[8]:**
A vague set A of L is called a VLI – ideal of L if it V_A(0) ≥ V_A(p) and

\[
V_A(p) ≥ \text{imin}\{V_A((p → q)), V_A(q)\}
\]
for all p, q ∈ L.

**Definition 2.11[10]:**
A vague set A is called a VILI – ideal of L if V_A(0) ≥ V_A(p) and

\[
V_A((p → q)) ≥ \text{imin}\{V_A((p → q) → q) → r)) ) , V_A(r)\}
\]
for all p, q, r ∈ L.

**Definition 2.12[9]:**
Let A be a vague set of a lattice implication algebra L. A is said to be a vague associative LI – ideal of L with respect to x if

\[
V_A(0) ≥ V_A(p) \quad \text{and} \quad V_A(x) ≥ \text{imin}\{V_A(((x → q) → p)) , V_A((q → x))\}
\]

**Definition 2.13[7]:**
A vague set H in L is said to be a vague fantastic LI - ideal of L if V_H(0) ≥ V_H(p) and V_H(((x → q) → p) → (p → r)) ≥ \text{imin}\{V_H(((p → r) → q)) , V_H(q)\}.

**III. ABSORBENT LI - IDEALS**

In this portion we gift the concept of Absorbent LI – perfect of grid inspiration polynomial math L and communicate different places of Absorbent LI – convictions.

Definition three.1: A nonempty subset An of a move segment concept variable based totally math L is referred to as Absorbent LI – immaculate of L if 0 ∈ An and (p → (q → p))’ ∈ An infers p ∈ A for all p, q ∈ L.

event three.2: allow L = zero, p, q, r I be an immovable. At that point truely (L, ∨, ∧, →, zero, 1) is cross phase notion variable based math in which the paired task → is portrayed as pursues:

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Then the set A = {0, p, r} is an absorbent LI – ideal of L.

**Remark 3.3:**
Let L = {0, p, q, r, s, I} be a set. Then clearly (L, ∨, ∧, →, 0, 1) is lattice implication algebra where the binary operation → is defined as follows:

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Cleary the set A = {0, p} is a LI – ideal of L. But it is not an absorbent LI – ideal of L because (s → (p → s))’ = 0 ∈ A and s ∉ A.

From the following theorem it is clear every ILI – ideal of L is an absorbent LI – ideal of L.

**Theorem 3.4:**
Every ILI – ideal of L is an absorbent LI – ideal of L.

**Proof:**
Let A be ILI – ideal of L and p, q ∈ L such that (p → (q → p))’ ∈ A.

Since (p → (q → p)) → (p → (q → (q → p))) = (p → (q → p)) → (p → ((p → q) → q)) = (p → (p → (q → p)) → (p → ((p → q) → q)) = (p → (p → (q → p)) → (p → ((p → q) → q)))

\[
(p → (p → (q → p)))) = (p → (q → p))
\]

Toward the end we get the result.
Then \((p \rightarrow (q \rightarrow p))' \leq (p \rightarrow (q \rightarrow p)).\) Hence A is an absorbent LI – ideal of L.

**Remark 3.5:**

The chats of the speculation three.four want not to be real. For the case the set A = {0, p, r} is an absorbent LI – ideal of L and p, q \(\in\) L such that \((p \rightarrow (q \rightarrow p))' \leq (p \rightarrow (q \rightarrow p)).\) Hence A is an absorbent LI – ideal of L.

**Proof:**

Let A be an absorbent LI – ideal of L and p, q \(\in\) L such that \((p \rightarrow (q \rightarrow p))' \leq (p \rightarrow (q \rightarrow p)).\) Hence A is an absorbent LI – ideal of L.

**Remark 3.9:**

The converse of the theorem 3.8 need not to be true. For example the set A = {0, p, r} is an absorbent LI – ideal of L. But it is not an associative LI – ideal of L because \((p \rightarrow (q \rightarrow p))' \rightarrow r' = 0 \in A\) and \((q \rightarrow (p \rightarrow r))' = q \notin A.\)

**end result three.10:**

allow An and B be LI – convictions of L with the end goal that a \(\subseteq B.\) In the off risk that An is a retentive LI – flawless of L, at that factor B is in manner permeable LI – first-rate of L.

**proof:**

it's far spotless by way of the concept 3.9 [15] and hypotheses three.5 and three.6.

**end result three.11:**

allow An and B be retentive LI – convictions of L then A \(\cap B\) is also permeable LI – nice of L.

**result three.12:**

permit A be LI – ideal of L, in the event that An is a spongy LI – exceptional of L, at that factor it is a extraordinary LI – ideal of L.

**proof:**

it's miles ideal by means of methods for the concept 3.5 [7] and hypotheses 3.5 and 3.6.

**hypothesis 3.13:**

allow A be a nonempty subset of L. At that factor An is a spongy LI – perfect of L if and exceptional if A' = p'/p \(\in\) A is a permissible channel of L.

**evidence:**

consider that an is a spongy LI – immaculate of L. Then 0 \(\in\) A, so I = 0' \(\in\) A'.

Let p, q \(\in\) L such that \((p \rightarrow q) \rightarrow p \in A'.\) Then \((p \rightarrow q) \rightarrow p' \in A'\) equivalent \((p' \rightarrow (p \rightarrow q))' \in A\) equivalent \((p' \rightarrow (q' \rightarrow p))' \in A.

This proves that A' is an absorbent filter of L.

Conversely suppose that A' is an absorbent filter of L.
Then \( I \in A' \), so \( 0 = I' \in A \).
Let \( p, q \in L \) such that \( (p \rightarrow (q \rightarrow p')) \in A \).
Then \( p \rightarrow (q \rightarrow p')' \in A' \) \( \Rightarrow (q \rightarrow p) \rightarrow p' \in A' \)
\( \Rightarrow (p' \rightarrow q') \rightarrow p' \in A' \)
\( \Rightarrow p' \in A' \)
\( \Rightarrow p \in A \).
Hence \( A \) is an absorbent LI – ideal of \( L \).

**IV. VAGUE ABSORBENT LI – IDEALS AND RESULTS**

In this component we Blessing the idea of undefined Absorbent LI – high quality of framework motivation polynomial mesh \( L \) and bring approximately brilliant houses of ill described Absorbent LI – goals.

Definition 4.1: An difficult to understand set \( A \) on \( L \) is known as da dubious retentive LI – perfect of \( L \) if \( V\alpha(0) \geq VA(p) \) and \( VA(p) \geq VA((p \rightarrow (q \rightarrow p'))') \) for all \( p, q \in L \).

model 4.2: let \( L \) be grid inspiration variable based totally math inside the model 3.2. characterize the ambiguous set
\[
H = V_H = \{ < p, f_a(p) > / p \in L \}
\]
as follows:
\[
t_{0}(a) = 0.732 \quad \text{if} \quad a = 0, p, r
\]
\[
t_{0}(a) = 0.63 \quad \text{if} \quad a = q, I
\]
\[
t_{0}(a) = 0.431 \quad \text{if} \quad a = q, I
\]
\[
t_{0}(a) = 0.25
\]

Clearly the vague set \( A \) is vague absorbent LI – ideal of \( L \).

Remark 4.3:
In reality the indistinct set \( A \) is VLI – best of \( L \). However it isn’t always a vague absorbent LI – perfect of \( L \) due to the fact
\[
\text{VG}(s) = [0.51, 0.392] \geq [0.63, 0.319] = \text{VG}(s \rightarrow p')'.
\]
From the subsequent theorem it’s far clean every VILI – ideal of \( L \) is a indistinct absorbent LI – best of \( L \).

Theorem 4.7:
every VILI of \( L \) is a vague absorbent LI – ideal of \( L \).

**Proof:**
Suppose that \( A \) is a vague absorbent LI – ideal of \( L \). Then \( A \) is a vague absorbent LI – ideal of \( L \) if and only if \( V_A(p) \geq imin \{ V_A((p \rightarrow (q \rightarrow p')) \rightarrow r'), V_A(r) \} \) for all \( p, q, r \in L \).

Taking \( r = 0 \) in the above inequality, we have
\[
V_A(p) \geq imin \{ V_A((p \rightarrow (q \rightarrow p')) \rightarrow 0'), V_A(0) \}
\]
\[
= imin \{ V_A((p \rightarrow (q \rightarrow p'))', V_A(0) \}
\]
\[
= V_A(p \rightarrow (q \rightarrow p')).
\]
Hence \( A \) is vague absorbent LI – ideal of \( L \).

Theorem 4.8:
Every vague associative LI – ideal of \( L \) is vague absorbent LI – ideal of \( L \).

**Proof:**
Let \( A \) be vague associative LI – ideal of \( L \) and \( p, q \in L \). Then clearly \( V_A((p \rightarrow (q \rightarrow p'))') = V_A((p \rightarrow 0') \rightarrow (q \rightarrow p'))' \).

Since \( A \) is vague associative LI – ideal, we have
\[
V_A((p \rightarrow 0') \rightarrow (q \rightarrow p'))' \leq V_A(p \rightarrow (0 \rightarrow (q \rightarrow p'))')
\]
\[
= V_A((p \rightarrow 0')') = V_A((p \rightarrow 0') = V_A(p).
\]
So A is vague absorbent LI – ideal of L.

discourse four.nine: the option of the speculation four.eight need never again to be substantial. for example the questionable set H in the model 4.2, is a questionable porous LI – first rate of L. yet, it’s far some angle anyway a vague well-known LI – nature of L in moderate of the way that VH

\[(q \rightarrow (p \rightarrow r))' = [0.431, 0.25] \geq [0.732, 0.19] = VH ((q \rightarrow p)') \rightarrow r)\]

Hypothesis 4.10: let A be unclear set on L. On the off chance that A will be an ill defined retentive LI – perfect of L, at that point the set

\[\hat{A}_a = \{ p / V_a(p) \geq V_a(a) \} \] where a ∈ L, is an absorbent LI – ideal of L.

Proof: Let A is a vague absorbent LI – ideal of L and a ∈ L. Let p, q ∈ L such that \( (p \rightarrow (q \rightarrow p))' \in \hat{A}_a \).

So \( V_a((p \rightarrow (q \rightarrow p))') \geq V_a(a) \).

Since A is vague absorbent LI – ideal, we have \( V_a(p) \geq V_a((p \rightarrow (q \rightarrow p))') \).

It yields \( p \in \hat{A}_a \).

Hence \( \hat{A}_a \) is an absorbent LI – ideal of L.

Theorem 4.11:

Let H be a vague set on L. Then H is a vague absorbent LI – ideal of L if and only if H(p, ρ, σ) is an absorbent LI – ideal when \( H(p, \rho, \sigma) \neq \emptyset \), \( \rho, \sigma \in [0, 1] \).

Proof:

Suppose that H is a vague absorbent LI – ideal of L and \( \rho, \sigma \in [0, 1] \).

If \( H(p, \rho, \sigma) \neq \emptyset \) then there exist \( p \in L \) such that \( V_{H}(p) \geq [\rho, \sigma] \).

Clearly \( V_{H}(0) \geq V_{H}(p) \geq [\rho, \sigma] \).

So \( 0 \in H(p, \rho, \sigma) \).

Let \( p, q, r \in L \) such that \( ((p \rightarrow (q \rightarrow p))' \in H(p, \rho, \sigma) \).

Since H is a vague absorbent LI – ideal, we have \( V_{H}(p) \geq V_{L}((p \rightarrow (q \rightarrow p))') \geq [\rho, \sigma] \).

So \( p \in H(p, \rho, \sigma) \) and it yields \( H(p, \rho, \sigma) \) is an absorbent LI – ideal of L.

Conversely, Suppose that \( H(p, \rho, \sigma) \neq \emptyset \) is an absorbent LI – ideal where \( \rho, \sigma \in [0, 1] \).

For all \( p \in L \), \( H_{H}(p) \neq \emptyset \) since \( p \in H_{H}(p) \), and so \( H_{H}(p) \) is an FLI ideal of L.

So \( 0 \in H_{H}(p) \), then we have \( V_{H}(0) \geq V_{H}(p) \).

Let \( p, q, r \in L \), let us consider \( (p \rightarrow (q \rightarrow p))' \in H(p, \rho, \sigma) \).

Then \( (p \rightarrow (q \rightarrow p))' \in H(p, \rho, \sigma) \).

If \( p \in H(p, \rho, \sigma) \) and it yields \( H(p, \rho, \sigma) \) is an absorbent LI – ideal of L.

Thus H is a vague absorbent LI – ideal of L.

Theorem 4.12:

Let J and K be vague absorbent LI – ideal of L such that \( J \subseteq K \). If J is a vague absorbent LI – ideal of L, then so is K.

Proof:

Let J and K be vague absorbent LI – ideal of L such that \( J \subseteq K \).

Since \( J \subseteq K \), that is \( V_J(p) \leq V_K(p) \) for all \( p \in L \).

Then clearly \( J(p, \rho, \sigma) \subseteq K(p, \rho, \sigma) \) for every \( p, \rho, \sigma \in [0, 1] \).

Since J is a vague absorbent LI – ideal then \( J(p, \rho, \sigma) \neq \emptyset \) is absorbent LI – ideal.

It gives \( K(p, \rho, \sigma) \neq \emptyset \) is a vague absorbent LI – ideal. It yields K is a vague absorbent LI – ideal of L.

Theorem 4.13:

Let A be absorbent LI – ideal of L. The vague set H defined by

\[ V_H(p) = [\rho, \rho] \] if \( p \in A \)

\[ = [0, 0] \] if \( p \notin A \)

is a vague absorbent LI – ideal of L. where \( \rho \in [0, 1] \).

Proof:

Let H be a vague set of L, defined by

\[ V_H(p) = [\rho, \rho] \] if \( p \in A \)

\[ = [0, 0] \] if \( p \notin A \), where \( \rho \in [0, 1] \).

We have \( 0 \in A \) and so \( V_H(0) = [\rho, \rho] \) \( \forall p \in L \).

If \( p \rightarrow (q \rightarrow p)' \in A \), where \( p, q \in L \), then

\[ V_A(p) = [\rho, \rho] \geq V_H((p \rightarrow (q \rightarrow p))') \].

Hence H is a vague absorbent LI – ideal of L.

Theorem 4.14:

Let H be a vague absorbent LI – ideal of L. Then \( A_H = \{ p \in L / V_H(p) = V_H(0) \} \) is an absorbent LI – ideal of L.

Proof:

Since \( A_H = \{ p \in L / V_H(x) = V_H(0) \} \), obviously \( 0 \in A_H \).

Let p, q ∈ L and \( (p \rightarrow (q \rightarrow p))' \in A_H \), then \( V_H((p \rightarrow (q \rightarrow p))') = V_H(0) \).

So \( V_A(p) \geq V_H((p \rightarrow (q \rightarrow p))') = V_H(0) \) as H is a vague absorbent LI – ideal of L.

And \( V_H(0) \geq V_H(p) \), it yields \( V_H(p) = V_H(0) \).Thus \( p \in A_H \).

Hence \( A_H \) is an absorbent LI – ideal of L.

V. CONCLUSION

Thinking about Y. Xu blanketed the conviction of Lattice inspiration variable based math, a few scientists building up the rule of thumb of various channels and LI – convictions. from the begin Y. B. Jun delivered the possibility of LI – gives of Lattice notion variable primarily based math. After that various analysts proposed the unique LI – convictions like as LI – desires, ILI – convictions, high LI – requirements and so forth relentless of this work we proposed the thoughts of FLI-standards and TLI – convictions in our beyond papers. currently added the conviction of Absorbent LI – convictions and tested the diverse homes. After that we watch the sick described plan to Absorbent LI – requirements. it’s far our legitimate with that our work encourages in helping and increasing one-of-a-kind investigates in this field

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