REVIEW OF LITERATURE

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A satisfactory theory of 2-norm and n-norm on a linear space has been introduced and developed by Gahler [20,21]. Following Misiak [36], Kim and Cho [29] and Malceski [35] developed the theory of n-normed space. Gunawan and Mashadi [22] gave a simply way to derive an (n-1)-norm from the n-norm and realized that any n-normed space is an (n-1) normed space. Hendra Gunawan and Mashadi [22] discussed Cauchy sequence and convergent sequence in n-normed space.

An interesting theory of 2-inner product space and n-inner product space has been effectively constructed by Diminnie, Gahler and White [11,12]. It was futher investigated and developed by Misiak [36,37].

The concept of fuzzy set introduced by Zadeh [45] in 1965 provides a natural frame work for generalizing many of the general topological concepts. In 1968, Chang [8] introduced the concept of fuzzy topological spaces. Since then many topologists extended many topological concepts to fuzzy topological spaces.

Katsaras [27] in 1984, initiated fuzzy norm on a linear space. In 1992, Felbin [18] introduced the idea of fuzzy norm on a linear space by assigning a fuzzy real number to each element of the linear space. Xiao and Zhu [24] redefined the idea of Felbin's [18] definition of fuzzy norm of a linear operator from a fuzzy normed linear space to another fuzzy normed linear space.

As an generalization of fuzzy sets, Atanassor [1,2] initiated the concept of intuitionistic fuzzy sets. Coker [13] introduced the idea of topology in intuitionistic fuzzy sets.

Since the number of papers published on these ideas are numerous, we restrict ourselves to few papers in this review of literature. We have given a brief survey of some of the published articles related to our topic.

1.CHARACTERIZATION OF BEST APPROXIMATIONS IN NORMED LINEAR SPACES OF MATRICES BY ELEMENTS OF FINITE DIMENSIONAL LINEAR SUBSPACES:

K.K.Lau, W.O.J.Riha [33], 1981

A general characterization theorem of best approximations in normed linear spaces of real nxn matrices endowed with the spectral norm is discussed.

2.FUZZY INNER PRODUCT SPACES:

A.M.El-Abyad and H.M.El-Hamouly [14], 1991

The N-Euclidean space M(I) is a fuzzy Pseudo-normed algebra, whose underlying set is the smallest real vector space including all nonnegative fuzzy real numbers. They have introduced a fuzzy inner product, on a unitary M(I)-module, with values in M(I). They have established the fuzzy Schwarz inequality for fuzzy inner products. They have introduced the cartesian product of fuzzy inner product spaces and investigated the relations between their underlying topologies and examples of fuzzy inner product spaces are discussed.

3.FUZZY INNER PRODUCT SPACES AND FUZZY NORM FUNCTIONS:

Biswas R [6], 1991

The author has defined fuzzy inner product spaces in a linear space, the fuzzy inner product of an element of the linear space, fuzzy norm function, the fuzzy norm of an element, and fuzzy orthogonality of one element to the other and proved that the fuzzy intersection of two fuzzy inner product space is also a fuzzy inner product space.

4. CONTINUITY OF FUZZY MULTIPLICATION IN THE N-EUCLIDEAN SPACE:

Nehad N, Morsi and Samy E.Yehia [39], 1992

The N-Euclidean space M(I) is a fuzzy normed vector space, whose underlying set is the smallest real vector space including all non-negative fuzzy real numbers. The fuzzy multiplication on the fuzzy real line easily extends to a multiplication on M(I). They have shown that, under that multiplication, M(I) is a fuzzy normed algebra. In consequence, fuzzy multiplication is shown to be continuous in the N-Euclidean topology on M(I).

5. FINITE DIMENSIONAL FUZZY NORMED LINEAR SPACES:

F.Clementina [18], 1992

The author has introduced the concept of a fuzzy normed linear space. He also proved that in a finite dimensional fuzzy normed linear space fuzzy norms are the same upto fuzzy equivalance. Finite dimensional fuzzy subspaces of a fuzzy normed linear space are proved to be necessarily complete fuzzy normed linear spaces.

6.ON FUZZY INNER PRODUCT SPACE AND FUZZY CO-INNER PRODUCT SPACES:

Kohil,J.K and Rajesh Kumar [32], 1993

The notions of fuzzy co-norm and fuzzy co-orthogonality are introduced by formulating the notion of a fuzzy co-inner product space, and their basic properties are studied.

7. SOME PROPERTIES OF FUZZY NEIGHBORHOOD NORMED LINEAR SPACES:

Khodadad.A.F.M and Ahsanullah.T.M.G [28], 1993

The authors have investigated some properties relating to continuity, uniform continuity and boundedness in fuzzy neighborhood normed linear space.

8. THE COMPLETION OF A FUZZY NORMED LINEAR SPACE:

F. Clementina [19], 1993

In this article the author has shown that incomplete fuzzy normed linear spaces can be embedded in the enlarged space for the completion.

9. SEPARATION OF FUZZY NORMED LINEAR SPACE:

Krishna.S.V and Sarma.K.K.M [31], 1994

This article deals with Hausdroff separation axiom for fuzzy topological spaces. The necessary and sufficient condition obtained in the fuzzy vector topology induced by a fuzzy norm is separated. Properties of separated and non-separated fuzzy norms along with examples are studied. Separation of a fuzzy norm in terms of the ordinary norm it induces and its consequences are characterised. Separation of quotient fuzzy semi-norm is studied.

10. THE COMPLETION OF FUZZY METRIC SPACES AND FUZZY NORMED LINEAR SPACES:

Byung-Soo Lee, Suk-Jin Lee and Kyung-Mi Park [7], 1999

The authors have proved that fuzzy metric spaces and fuzzy normed linear spaces are complete.

11. ON LINEARLY TOPOGICAL STRUCTURE AND PROPERTY OF FUZZY NORMED LINEAR SPACE:

Jianzhong Xiao and Xinghoa zhu [25], 2002

In this article the simplified definition of fuzzy normed linear space is introduced and the different structure of fuzzy normed linear space with variable right norm R is discussed in terms of topological vector space.Properties such as compactness, completeness and density are studied under more general left norm L and right norm R.As application the linearly topological structure of Menger PN space is obtained.

12.FUZZY NORMED SPACE OF OPERATORS AND ITS COMPLETENESS:

Jian-zhong Xiao and Xing-hua Zhu [24], 2003

The authors have introduced the concept of the fuzzy norm of a linear operator from one fuzzy normed linear space into another and studied their boundedness of such an operator and the space of all bounded linear opearators endowed with this fuzzy norm. Its topological structure as well as completeness are discussed and proved that it can itself be made into a fuzzy normed linear space.

13.FUZZY BOUNDED LINEAR OPERATORS:

T.Bag and S.K.Samanta [4], 2005

A notions of boundedness of a linear operator from a fuzzy normed linear space to another fuzzy normed linear space is introduced and two types (strong and weak) of fuzzy bounded linear operators are studied. Relation between fuzzy continuity and fuzzy boundedness is studied. Definitions of fuzzy bounded linear functionals are given and the notions of fuzzy dual spaces are developed. The Hahn - Banach theorem, the open mapping theorem, the closed graph theorem and the uniform boundedness principle theorem are established.

14. ON THE INTUITIONISTIC FUZZY TOPOLOGICAL SPACES:

Reza Saadati and Jin Han Park [40], 2005

The authors have defined precompact set in intuitionistic fuzzy metric spaces and proved that any subset of an intuitionistic fuzzy metric space is compact if and only if it is precompact and complete. Also, they have defined topologically complete intuitionistic fuzzy metrizable spaces and proved that any G_δ set in a complete intuitionistic fuzzy metric spaces is a topologically complete intuitionistic fuzzy metrizable space and vice versa. Further they have introduced intuitionistic fuzzy normed spaces and fuzzy boundedness for linear operators and proved that every finite dimensional intuitionistic fuzzy normed space is complete.

15.FUZZY COMPACT LINEAR OPERATORS:

Fatemeh Lael and Kourosh Nourouzi [17], 2005

The authors have introduced fuzzy compact linear operators between fuzzy normed spaces and investigated some important general properties of them.

16. ON FUZZY NORMED SPACES:

Ioan Golet [23], 2007

A fuzzy norm is defined on a set of objects which is endowed with a structure of linear space. The author has studied the relationships between fuzzy norms and fuzzy metrics and between fuzzy norms and topological structures on the same linear space.

17. SOME FIXED POINT THEOREMS IN FUZZY NORMED LINEAR SPACES:

Bag.T and Samanta.S.K [5], 2007.

The authors have introduced the concepts of sectional fuzzy continuous mappings, I-fuzzy compact sets, asympotic fuzzy normal structure and strongly uniformly

convex fuzzy normed linear spaces. Schauder-type and other fixed point theorems have been established in fuzzy normed linear spaces.

18.FINITE DIMENSIONAL INTUTIONISTIC FUZZY NORMED LINEAR SPACE:

Samanta.T.K [41], 2008

Following the definition of intuitionistic fuzzy n-norm by Vijayabalaji, Thillaigovindan and Yong Bae Jen [44], the author has introduced the definition of intuitionistic fuzzy norm (in short IFN) over a linear space and discussed few results on intuitionistic fuzzy normed linear spaces and finite dimensional intuitionistic fuzzy normed linear spaces. Further the author has introduced the concepts of intuitionistic fuzzy continuity and sequentially intuitionistic fuzzy continuty and proved that they are equivalent.