PREFACE

The concept of Fuzzy Sets was introduced by
L.A.Zadeh in 1965. Since its inception, the theory of
fuzzy sets has developed in many directions and it is
finding applications in a wide variety of fields. As
an outgrowth of these attempts, the concept of Multiple
Boolean Algebra is introduced in 1985 by Silvano Di
Zenzo [1] . We have tried to study these structures
on fuzzy sets.

Though this study is combine one, the concept of
multiple Boolean algebra and that of fuzzy sets are
independent. A multiple Boolean algebra is an attempt
to generalise the Boolean algebra, where as Fuzzy set
is generalisation of ordinary set. The set of all
subsets of a set becomes a Boolean algebra. On the other
hand Zenzo shows that the set of all fuzzy subsets
of a set becomes a multiple Boolean algebra if the
binary operations on it are defined in a suitable
manner.

Zenzo has considered the case of finite multiple
Boolean algebras only. We have defined multiple Boolean
algebra which also includes the infinite case. Our
definition comes as an innate generalisation of his.
Example of infinite multiple Boolean algebra can be ea-
sily given using his considerations. Moreover, his

considerations also offer us some new fuzzy connectives
defined along purely algebraic lines.

We have introduced isomorphism between two
multiple Boolean algebras. Through this isomorphism
we have proved that all the examples of multiple Boolean
algebra given by Zenzo are nothing but the powers of the
basic multiple Boolean algebra defined by him. Our main
contribution seems to be the example 3 in chapter 1
which probably becomes an obstacle in our way of stru-
cture determination. In this view, we suggest an im-
provement in the definition of multiple Boolean algebra
Further, as one x naturally tempts to do, we have defined
sub-multiple Boolean algebra.

The dissertation consists of four chapters. In
chapter 0, basic definitions, from fuzzy set theory
and Boolean algebra theory are stated along with some
known results which are used throughout in the subsequent
part of the dissertation.

Chapter 1 deals with the notion of multiple Boolean
algebra as introduced by Zenzo. The proofs of the
existence theorems are given in more details. Isomorphism
of multiple Boolean algebras is defined which is followed
by some structure determining theorems. A'different'
multiple Boolean algebra is given.

In chapter 2, new fuzzy connectives are introduced

and it is shown that the algebraic structure so determined over the fuzzy sets is that of a pair of multiple Boolean algebras.

Chapter 3 contains insertion of some more fuzzy relations which seem to be appropriate through which simple theorems are proved. A definition of sub multiple Boolean algebra is given.

Finally, more appropriate title of the dissertation would have been. " A Study of Multiple Boolean algebra and Fuzzy Sets." However for some technical reasons, this change could not be incorporated.

————×————

" Science is what we know and Philosophy
is what we don't know "

          —   Bertrand Russel.