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SMARANDACHE-R-MODULES AND ALGORITHMS

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ABSTRACT

In this paper we introduced Smarandache-2-algebraic structure of R-modules namely Smarandache- R-modules. A Smarandache-2-algebraic structure on a set N means a weak algebraic structure A_0 on N such that there exists a proper subset M of N, which is embedded with a stronger algebraic structure A_1 , stronger algebraic structure means satisfying more axioms, by proper subset one understands a subset different from the empty set, form the unit element if any, from the whole set. We define Smarandache-R-modules and obtain some of its algorithms through on CS-Algebras , on BF-Algebras, and on BRK-Algebras. We refer to Raul Padilla[10].

Keywords : *R-modules, Smarandache-R-modules, CS-Algebras, BF-Algebras, and BRK-Algebras*

INTRODUCTION

In order that new notions are introduced in algebra to better study the congruence in number theory by Florentin Smarandache [**1**]. By <proper subset> of a set A we consider a set P included in A, and different from A, different form the empty set, and from the unit element in A-if any they rank the algebraic structures using an order relationship:

They say that the algebraic structures $S_1 << S_2$ if: both are defined on the same set; all S_1 laws are also S_2 laws; all axioms of an S_1 law are accomplished by the corresponding S_2 law; S_2 law accomplish strictly more axioms that S_1 laws, or S_2 has more laws than S_1.

For example: Semi group << Monoid << group << ring<< field, or Semi group<< commutative semi group, ring<< unitary, ring etc. They define a General special structure to be a structure SM on a set A, different form a structure SN, such that a proper subset of A is on structure, where SM<< SN <<.

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PRELIMINARIES:

DEFINITION:1.1

A left R- modules A is a system with two binary operations, addition and multiplication, such that

(i) the elements of A form a group **(A,+)** under addition,
(ii) the elements of A form a multiplicative semi-group,
(iii) x(y + z) = xy + xz, for all x,y,z ∈A
In particular, if A contains a multiplicative semi-group S whose elements generate (A,+) and satisfy
(iv) (x+y)s = xs + ys, for all x,y ∈A and s∈S, then we say that A is a distributively generated R-modules.

DEFINITION :1.2

A R – Modules (B,+,**.**) is said to be Smarandache- R-modules whose proper subset A is a S - algebra with respect to same induced operation of B.

DEFINITION :1.3 (Alternative definition for S-R-modules**)**

If there exists a non-empty set A which is a R-modules such that it superset B of A is a S-algebra with respect to the same induced operation, then B is called Smarandache- R-modules It can also written as S-R-modules.

ALGORITHMS

BE algebras: Ahn.S.S and So.K.S has introduced BE algebras and satisfies the following conditions for all x, y and z in A

1) $x * x = 1$
2) $x * 1 = 1$
3) $1 * x = x$
4) $x * (y * z) = y * (x * z)$.

According to Raul Padilla (4,Thm.1.60d) R is a module, Now by definition, R is a Smarandache-R-modules

ALGORITHMS:I

Step 1: Consider a R-module R
Step 2: Let x, y and z in A
Step 3: Choose $x * y \leq$ y $N * xN$
Step 4: Choose $x \leq y$ *implies* $yN \leq xN$
Step 5: Verify x * $(y * z) = (x * y) * (x * z)$
Step 6: If step 5 is true then R is a Smarandache-R-module

ALGORITHM:II

Step1: Consider a R-module R
Step 2: Let x, y and z in A
Step 3: Choose $(y * x) * y \leq x * y$.
Step 4: Choose $x * (x * y) = x * y$.
tep 5: Verify x * $(y * z) = (x * y) * (x * z)$,

Step 6: If step 5 is true then by definition, we write R is a Smarandache-R-module

BRK ALGEBRA

BRK algebras: Imai and Iseki has introduced BRK algebras and satisfies the following conditions

1) $(x * y) * (x * z) \leq (z * y)$
2) $x * (x * y) \leq y$
3) $x \leq x$
4) $x \leq y$ and $y \leq x$ imply $x = y$
5) $x \leq 0$ implies $x = 0$, where $x \leq y$ is defined by $x * y = 0$, for all $x, y, z \in X$.

According to Raul Padilla (4,Thm.1.60d) R is a module, now by definition, R is a Smarandache-R-modules.

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ALGORITHMS III

Step1: Consider a R-module R
Step 2: Let x, y in A
Step 3: Let $x * x = 0$
Step 4: Choose x $* y = 0$
Step 5: Choose $y * x = 0$
Step 6: Verify that $0 * x = 0 * y$.
Step 7: If step 6 is true then we write R is a Smarandache-R-module.

ALGORITHM:IV

Step1: Consider a R-module R
Step 2: Let a, b and c in A
Step 3: Choose $a * b$
Step 4: Choose $a * c$
Step 5: Verify $a * b = a * c$ then $0 * b = 0 * c$
Step 6: If step 5 is true then R is a Smarandache-R-module

BF-ALGEBRA

According to Andrzej Walendziak has introduced on BF algebras for the following conditions

a) $0 * (x * y) = y * x$.

b) $0 * (0 * x) = x$

c) if $0 * x = 0 * y$, then $x = y$

d)) if $x * y = 0$. then $y * x = 0$

for any x, $y \in A$;

According to Raul Padilla (4,Thm.1.60d) R is a module, now by definition, R is a Smarandache-R-modules
Given R be a Smarandache-R-module, if there exists a proper subset A of R in which satisfies the following statements

(a) A *is a BF\-algebra;*

(b) $x = [x * (0 * y)] * y$ for all $x, y \in A$;

(c) $x = y * [(0 * x) * (0 * y)]$ for all $x,y \in A$.

According to Raul Padilla (4,Thm.1.60d) R is a module, now by definition, R is a Smarandache-R-modules

ALGORITHM:V

Step1: Consider a R-module R
Step 2: Let x, y in A
Step 3: Choose x $* y = 0$
Step 4: Choose $y * x = 0$
Step 5: Check $x = 0 * (0 * x) = x * 0$
Step 6: Verify that x = y
Step 7: If step 6 is true then we write R is a Smarandache-R-module

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ALGORITHM:VI

Step1: Consider a R-module R
Step 2: Let x, y in A
Step 3: Choose x $*$ y= 0
Step 4: Choose $y * x$ = 0
Step 5: Check $x = y*(0 * x) * (0 * y)$
Step 6: Verify that x = y
Step 7: If step 6 is true then we write R is a Smarandache-R-module

Given R be a smarandache-R-module, if there exists a proper subset A of R in which *BG-algebra* satisfies the following statements

(a) A *is a BG-algebra;*

(b) *For* $x,y \in A$, $x * y = 0$ *implies* $x = y$;

(c) *The right cancellation law holds in* A. *i.e., If* $x*y = z*y$, *then* $x = z$ *for any* $x,y,z \in A$;

(d) *The left cancellation law holds in* A. *i.e., if* $y*x = y*z$, *then* $x = z$ *for any* $x.y,z \in A$.

According to Raul Padilla (4,Thm.1.60d) R is a module, now by definition, R is a Smarandache-R – Modules

ALGORITHM:VII

Step1: Consider a R-module R
Step 2: Let x, y in A
Step 3: Choose x $*$ y= 0
Step 4: Choose $y * x$ = 0
Step 5: Check $x = (x * y) * (0 * y) = 0 * (0 * y)$
Step 6: Verify that x = y
Step 7: If step 6 is true then we write R is a Smarandache-R-module

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