##### Quadripartitioned single valued neutrosophic refined contra Generalized pre continuous mappings

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**Abstract:** The focus of this paper is to introduce and study the notions of quadripartitioned single valued neutrosophic refined contra generalized pre-continuous mappings in quadripartitioned single valued neutrosophic refined topological spaces.We examine some of its basic characteristics and properties.

**Keywords:**Quadripartitioned single valued neutrosophic refined topology,QNRCGP-conti.mapping,QNRC-conti.mapping,QNRCG-closed set.

## 1 Introduction

L.A. Zadeh [9]was the first to explain fuzzy sets and fuzzy set operations. Fuzzy topological spaces were first introduced and developed by Chang [4]. The earliest publication of the "Intuitionistic fuzzy set" notion was made by Atanassov [1].Fuzzy sets and neurothosophic sets, an expansion of intuitionistic fuzzy sets, were first described by Smarandache[6]. Neutosophic set theory addresses the problem of uncertainty. As an extension of intuitionistic fuzzy sets, fuzzy sets, and the classical set, Wang [7] proposed single-valued neutrosphic sets.Four membership functions make up Chatterjee’s quadripartitioned single valued neutrosophic sets: truth, contradiction, unknown, and falsity. Deli et al.’s [5] development of intuitionistic fuzzy multisets and fuzzy multisets was the introduction of neurosophic refined sets.This paper is arranged in the following manner:Section 2 consists of basic concepts.Section 3 consists of quadripartitioned single valued neutrosophic refined contra generalized pre continuous mapping and its characterizations.

## 2 Preliminaries

**Definition 2.1** *[2] A QSVNRS on can be defined by ={,:}*

where:[0,1] such that 0+++4 (J=1,2,...P) and for every . are the truth membership sequence,a contradiction membership sequence,an unknown membership sequence and falsity membership sequence of the element x respectively. P is also referred to as the QSVNRS() dimension.

**Definition 2.2** *[2] Let , QSVNRS() havimg the form*

={,:} (J=1,2,...P)

={,:} (J=1,2,...P).Then

1. if , , and J=1,2,...P)

2. ={,:} (J=1,2,...P)

3. = and is defined by

=max{,}, =max{,}, =min{,}, =min{,} for all and J=1,2...P.

4. = and is defined by

=min{,}, =min{,}, =max{,}, =max{,} for all and J=1,2...P.

**Definition 2.3** *[2] A QSVNRTS on in a family of QSVNRS in which satisfy the following axioms.*

1. , .

2. for any , .

3. for every{ : i I} .

Here the pair (,) is called a QSVNRTS and any QSVNRS in is said to be quadripartitioned single valued neutrosophic refined open set (QNROS) in . The complement of of a QNROS in a QSVNRTS (,) is known as quadripartitioned single valued neutrosophic refined closed set (QNRCS) in .

**Definition 2.4** *[2] Let (,) be a QSVNRTS and ={,:} for J=1,2,...P be QSVNRS in X.Then quadripartitioned single valued neutrosophic refined closure (QNR() and quadripartitioned single valued neutrosophic refined interior (QNR) are defined by*

QNR = {K:K is a QNRCS in and K}

QNR= {L:L is a QNROS in and L }

**Definition 2.5** *[2] Let (,) be a QSVNRTS is known as*

1.Quadripartitioned single valued neutrosophic refined semi closed set(QNRSCS) if QNRint(QNRcl()) .

2.Quadripartitioned single valued neutrosophic refined pre-closed set(QNRPCS) if QNRcl(QNRint()) .

3.Quadripartitioned single valued neutrosophic refined -closed set(QNRCS) if QNRcl(QNRint(QNRcl())) .

4.Quadripartitioned single valued neutrosophic refined regular closed (QNRRCS) if = QNRcl(QNRint()).

5.Quadripartitioned single valued neutrosophic refined semi-pre closed set(QNRSPCS) if QNRint(QNRcl(QNRint())) .

**Definition 2.6** *[2] Let (,) be a QSVNRTS is known as*

1.generalized closed set (QNRGCS) if QNRcl() L whenever L and L is a QNROS in .

2.generalized pre closed set (QNRGPCS) if QNRPcl() L whenever L and L is a QNROS in .

3.generalized semi closed set (QNRGSCS) if QNRScl() L whenever L and L is a QNROS in .

4.generalized closed set (QNRGCS) if QNRcl() L whenever L and L is a QNROS in .

5.generalized semi-pre closed set (QNRGSPCS) if QNRSPcl() L whenever L and L is a QNROS in .

**Definition 2.7** *[3] Let (,) and (,) be any two QSVNRTS. A map (,) (,) is known as,*

• Quadripartitioned single valued neutrosophic refined continuous (QNR conti) if () QNRCS() for all QNRCS of (,).

• Quadripartitioned single valued neutrosophic refined semi-continuous (QNRS conti) if () QNRSCS() for all QNRCS of (,).

• Quadripartitioned single valued neutrosophic refined pre-continuous (QNRP conti) if () QNRPCS() for all QNRCS of (,).

• Quadripartitioned single valued neutrosophic refined semi pre-continuous (QNRSP conti) if () QNRSPCS() for all QNRCS of (,).

• Quadripartitioned single valued neutrosophic refined -continuous (QNR-conti) if () QNRCS() for all QNRCS of (,).

• Quadripartitioned single valued neutrosophic refined regular continuous (QNRR conti) if () QNRRCS() for all QNRCS of (,).

• Quadripartitioned single valued neutrosophic refined generalized continuous (QNRG conti) if () QNRGCS() for all QNRCS of (,).

• Quadripartitioned single valued neutrosophic refined generalized semi continuous (QNRGS conti) if () QNRGSCS() for all QNRCS of (,).

• Quadripartitioned single valued neutrosophic refined generalized semi pre-continuous (QNRGSP conti) if () QNRGSPCS() for all QNRCS of (,).

• Quadripartitioned single valued neutrosophic refined generalized-continuous (QNRG conti) if () QNRGCS() for all QNRCS of (,).

## 3 Quadripartitioned single valued neutrosophic refined contra generalized continuous mappings

**Definition 3.1** *A map : (A,) (B,) is known as Quadripartitioned single valued neutrosophic refined contra generalized continuous(QNRCGP-conti)mapping if () is a QNRGPCS in (A,) for every QNROS in (B,).*

**Example 3.2** *Let A = {e,f} and B = {w,x}*

={e,{0.4,0.6,0.7,0.8},{0.5,0.6,0.8,0.3},{0.5,0.7,0.3,0.4},

f,{0.6,0.7,0.4,0.5},{0.7,0.8,0.5,0.6}, {0.8,0.6,0.5,0.7}}

={w,{0.6,0.8,0.2,0.3},{0.7,0.8,0.3,0.5},{0.6,0.5,0.4,0.3},

x,{0.8,0.7,0.4,0.6},{0.6,0.5,0.4,0.3}, {0.7,0.6,0.3,0.5}}

Then = {,, } and = {,, } are QSVNRTS on A and B.Define a mapping : (A,) (B,) by (e) = w and (f) = x.Then is QNRCGP-conti.mapping.

**Theorem 3.3** *Every QNRC-conti.mapping is a QNRCGP-conti.mapping but not conversely.*

*Proof.* Let : (A,) (B,) be a QNRC-conti.mapping.Let be a QNROS in B.Then () is a QNRCS in A.Since every QNRCS is a QNRGPCS,() is a QNRGPCS in A.Hence is a QNRCGP-conti.mapping.

**Example 3.4** *Let A = {e,f} and B = {w,x}*

={e,{0.4,0.3,0.6,0.5},{0.6,0.5,0.8,0.7},{0.5,0.3,0.6,0.8},

f,{0.5,0.4,0.7,0.6},{0.3,0.4,0.7,0.5}, {0.6,0.4,0.8,0.7}}

={w,{0.5,0.6,0.3,0.4},{0.4,0.3,0.5,0.6},{0.6,0.5,0.5,0.7},

x,{0.4,0.3,0.6,0.5},{0.8,0.7,0.6,0.4}, {0.5,0.6,0.7,0.6}}

Then = {,, } and = {,, } are QSVNRTS on A and B.Define a mapping : (A,) (B,) by (e) = w and (f) = x.Then is QNRCGP-conti.mapping but not QNRC-conti.mapping.

**Theorem 3.5** *Every QNRC-conti.mapping is a QNRCGP-conti.mapping but not conversely.*

*Proof.* Let : (A,) (B,) be a QNRC-conti.mapping.Let be a QNROS in B.Then () is a QNRCS in A.Since every QNRCS is a QNRGPCS,() is a QNRGPCS in A.Hence is a QNRCGP-conti.mapping.

**Example 3.6** *Let A = {e,f} and B = {w,x}*

={e,{0.3,0.4,0.7,0.6},{0.4,0.5,0.7,0.8},{0.4,0.5,0.6,0.7},

f,{0.4,0.5,0.8,0.7},{0.3,0.4,0.6,0.8}, {0.6,0.5,0.7,0.8}}

={w,{0.5,0.6,0.6,0.5},{0.5,0.7,0.6,0.7},{0.5,0.6,0.6,0.5},

x,{0.6,0.7,0.7,0.6},{0.4,0.5,0.6,0.7}, {0.7,0.5,0.6,0.7}}

Then = {,, } and = {,, } are QSVNRTS on A and B.Define a mapping : (A,) (B,) by (e) = w and (f) = x.Then is QNRCGP-conti.mapping but not QNRC-conti.mapping.

**Theorem 3.7** *Every QNRCP-conti.mapping is a QNRCGP-conti.mapping but not conversely.*

*Proof.* Let : (A,) (B,) be a QNRCP-conti.mapping.Let be a QNROS in B.Then () is a QNRPCS in A.Since every QNRPCS is a QNRGPCS,() is a QNRGPCS in A.Hence is a QNRCGP-conti.mapping.

**Example 3.8** *Let A = {e,f} and B = {w,x}*

={e,{0.6,0.5,0.8,0.7},{0.4,0.3,0.5,0.6},{0.5,0.4,0.5,0.7},

f,{0.4,0.3,0.5,0.8},{0.5,0.6,0.8,0.9}, {0.4,0.5,0.8,0.7}}

={w,{0.7,0.8,0.7,0.6},{0.6,0.5,0.3,0.4},{0.6,0.4,0.4,0.6},

x,{0.7,0.5,0.3,0.6},{0.6,0.7,0.7,0.8}, {0.7,0.6,0.5,0.6}}

Then = {,, } and = {,, } are QSVNRTS on A and B.Define a mapping : (A,) (B,) by (e) = w and (f) = x.Then is QNRCGP-conti.mapping but not QNRCP-conti.mapping.

**Theorem 3.9** *Let : (A,) (B,) be a mapping.Then the following conditions are equivalent.*

1. is a QNRCGP-conti.mapping.

2.() is a QNRGPOS in A for every QNRCS in B.

*Proof.* 1) 2):Let be a QNRCS in B.Then is a QNROS in B.By statement,() is a QNRGPCS in A.Hence () is a QNRGPOS in A.

2) 1):Let be a QNROS in B.Then is a QNRCS in B.By statement,() is a QNRGPOS in A.Hence () is a QNRGPCS in A.Thus is a QNRCGP-conti.mapping.

**Theorem 3.10** *Let : (A,) (B,) is a QNRCGP-conti.mapping if (QNRPcl())QNRint(()) for every in B.*

*Proof.* Let be a QNRCS in B.Then QNRcl() = .Since every QNRCS is a QNRPCS,this implies QNRPcl() = .By hypothesis,() = (QNRPcl()) QNRint(()) ().This implies () is a QNROS in A.Therefore is a QNRC-conti.mapping,since every QNRC-conti.mapping is a QNRCGP-conti.mapping, is a QNRCGP-conti.mapping.

**Theorem 3.11** *A QNR-conti.mapping : (A,) (B,) is a QNRCGP-conti.mapping if QNRGPO(A) = QNRGPC(A).*

*Proof.* Let be a QNROS in Y.By hypothesis () is a QNROS in A and hence is a QNRGPOS in A.since QNRGPO(A) = QNRGPC(A),() is a QNRGPCS in A.Therefore is a QNRCGP-conti.mapping.

## 4 Conclusion

In this paper,we introduced uadripartitioned single valued neutrosophic refined contra generalized pre-continuous mappings and some of this characterizations.

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