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Note on Contranano Semipre Continuous Functions

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Abstract

This study is devoted to introducing and also it looks into the properties of nano semipre-cont, nano semipre-open funcs, nano semipre-closed funcs, Contranano semiprecont.funcs and obtains some relationship between the existing sets.

Keywords: Almost Nβ-cont, Contranano β-cont, Nano β-cont, Nano β-closed, Nano β-open, NP-β-open, Nβ-regular

1. Introduction and Preliminaries

In[1] introduced generalized closed sets in topological spaces. The notion of Nano topology was introduced by[2]. The basic definitions are referred from the following study[2-9]. Throughout this study, func represents the function, image as ima, continuous as cont, inverses as invrs.

2. Nano Semiprecont, Nano semipreopen and Nano semipreclosed Funcs

In this section, we study some additional properties of Nβ-cont.func, Nβ-open and Nβ-closed funcs.

Definition 2.1. A func k is called Nβ-open if the ima of each nano open set A of U is Nβ-open in V.

Definition 2.2. A func is called Nβ-closed if the ima of nano closed set A of U is Nβ-closed in V.

Theorem 2.2. Let be a Nβ-contand Nα-open func then the invrsima of each nano open set in V is Nβ -open in U.

Theorem 2.3. Let be a Nβ-contand nano open mapping then the following statements hold.

(a) The invrsima of each NP-open set in V is Nβ-open in U

(b) The invrsima of each NS-open set in V is Nβ-open in U

Theorem 2.4. Let be bijective Nβ-contand l: $V \rightarrow W$ be bijectivenanocont.funcs then l*o*k: $U \rightarrow W$ is Nβ-cont. func.

Prook: Let V be any nano open subset of Z then $l^{-1}(V)$ benano open in Y and as f is Nβ-cont$k^{-1}(l^{-1}(V))$ is Nβ-open in X i.e., $(l o k)^{-1}(V)$ is Nβ- open in X implies l*o*k is Nβ-cont.func.

Theorem 2.5. Each NS-open (NP-open) func is Nβ-open but not conversely.

Let k: $U \rightarrow V$ be NS-open (NP-open) and A be any nano open subset of U then (A) is NS-open (NP-open) in Y, as every NS-open (NP-open) set is Nβ-open, k(A) is Nβ-open in X. Hence f is Nβ-open function.

Theorem 2.6. A bijectivefunc is Nβ-open iff it is Nβ-closed.

Theorem 2.7. Let k: $U \rightarrow V$ be bijective Nβ-open (Nβ-closed) func. $W \subset V$ and $F \subset U$ is a nanoclosed(nano-open) set containing k^{-1} (W) then Nβ-closed (Nβ-open) set H of V containing W such that $k^{-1}(H) \subset F$.

3. Contranano Semipre Contfunctions

In this section, we study a new class of func s called Contranano semi pre cont. funcs and its related properties.

Definition 3.1. A funck: U → V is called Contranano semi pre (or Contranano-β) cont. func if the invrsima of each nano open set of V is Nβ-closed set in U.

Definition 3.2. A funck: U → Vis called nano almost β-cont, if the invrsima of each NRO (U,X) A of a space (V, τ_R'(Y)) is NβO(U,X) in (U,τ_R(X)) and it is denoted by almost Nβ-cont.

Definition 3.2. A funck: U → Vis said to be nano pre-semipre (or NPβ) open if the f(B) is Nβ-open in V for eachNβ-open set B in U.

Definition 3.3. A subset A of U is said to be nano semipre regular, if it is both Nβ-open and Nβ-closed set and set of all Nβ regular sets of U is denoted by NβR(U).

Lemma 3.5. In aNTSU, Nβcl(A) ⊂Npcl(A) ∩ Nscl(A) and hence we have Nβcl(A) ⊂Npcl(A),Nβcl(A) ⊂Nscl(A).

Lemma 3.6. EachNβ-open and Nα-closed is nano-closed and Nβ-closed and Nα-open is nano-open.

Lemma 3.7. A funck: U → V is nano open and nanocont then for any nano open subset A of U then i) f(Nint(A)) ⊂Nintf(A) ii) f(Ncl(A)) = Ncl(f(A)).

Theorem 3.8. If a funck: U → V is NP-β-open, contra Nβ-cont and V is nano extremely disconnected then f is Almost Nβ-cont.

Theorem 3.9. The set of all points x of U at which k: U → V is not contraNβ-cont is identical with the union of the Nβ frontier of the invrsimas of nanoclosed sets of V containing f(x).

Theorem 3.10. If a funck: U → V is Nαcontand contra Nβ-contthen f is nanocont.

Theorem 3.11. If a funck: U → Vis Nα-open and contrananoβ-open func then f is nano openfunc.

Theorem 3.12. If a funck: U → V is Nαclosed and contrananoβclosed func then f is nanoclosedfunc.

Theorem 3.12. If a funck: U → V Contranano β-open, l: V → W is NP-β-closed then lok: U → W is contranano pre-open func.

Theorem 3.13. A subset of U in nano topological space U be Nβ regular then a funck: U → Vis contraNβ-contif and only if f is Nβ-cont.

Proof: Let a subset of U be Nβ regular and let k: U → Vbe contra Nβ-cont then for each nano open set A of V, k^{-1}(A) is Nβ-closed in U and hence it is Nβ-open as it is Nβ regular. Thus, invrsima of nano open set is Nβ-open implies f is Nβ cont.

Conversely: Let a subset of U be Nβ regular and let k: U → Vbe Nβ-contthen for each nano open set A of V, k^{-1}(A) is Nβ- open in U and hence it is Nβ-closed as it is Nβ regular. Thus, invrsima of nano open set is Nβ-closed implies f is Nβ-cont.

Theorem 3.15. Each Contrananosemicont (contranano pre-cont) func is Nβ-cont.

But converse of the above theorem need not be true in general.

Theorem 3.16. If the space U is nanoextremally disconnected, then each contra Nβ-cont. func is contranano pre-cont.

Lemma 3.17. Let A be a subset of a nano topological space U. Then each Nβ-open (Nβ-closed) set is nano semi-open ((nano semi-closed) if Nint (Ncl(A)) ⊂Ncl(Nint(A)).

4. Conclusion

The properties of nano semiprecont, nano semipreopenfuncs, nano semipre closed funcs, Contranano semiprecont.funcs are investigated.

5. References

1. Levine N. Generalized closed sets in topology. Rendiconti del Circolo Matematico di Palermo. 1970; 19(1):89-96. https://doi.org/10.1007/BF02843888
2. Thivagar ML, Richard C. On nano forms of weekly open sets. International Journal of Mathematics and Statistics Invention (IJMSI). 2013; 1(1):31-7.
3. On New Class of Contra Continuity in Nano Topology. Available from: https://www.researchgate.net/profile/Saeid_Jafari3/publication/315892547_On_new_class_of_contra_continuity_in_nano_topology/links/590dadad4585159781859589/On-new-class-of-contra-continuity-in-nano-topology.pdf. Date accessed: 2016.
4. Khalaf MM, Nimer KN. Nano PS - open sets and Nano PS - continuity. International Journal of Contemporary Mathematical Sciences. 2015; 10(1):1-11. https://doi.org/10.12988/ijcms.2015.4545

5. Theoretical Aspects of Reasoning about Data. Available from: https://www.springer.com/in/book/9780792314721. Date accessed: 1991.
6. Revathy A, Illango G. On nanoβ-open sets. International Journal of Contemporary Mathematical Sciences. 2015; 1(2):1-6.
7. Sathishmohan P, Rajendran V, Devika A, Vani R. On nano semi-continuity and nanoprecontinuity. International Journal of Advanced Research. 2017; 3(2):76-9.
8. Sathishmohan P, Rajendran V, Dhanasekaran PK, Vignesh Kumar C. More on preneighbourhoods in NTS. Journal of Applied Science and Computations. 2018; 5(10):899-907.
9. Sathishmohan P, Rajendran V, Vignesh Kumar C, Dhanasekaran PK. On nano semipreneighbourhoods on NTS. Malaya Journal of Mathematik. 2018; 6(1):294-8. https://doi.org/10.26637/MJM0601/0034