On*KSgp*[*KSgsp*]-RegularandNormalSpacesinKasaj TopologicalSpaces

P. Sathishmohan[1], M. Sindhu[2], K. Rajalakshmi[3], V. Rajendran[4]

[1]Assistant Professor, Department of Mathematics, Kongunadu Arts and Science College (Autonomous), Coimbatore-641029.
[2]Research Scholar, Department of Mathematics, Kongunadu Arts and Science College (Autonomous),Coimbatore-641029.
[3]Assistant Professor, Department of Science and Humanities, Sri Krishna College of Engineering and Techonology, Coimbatore,TamilNadu, India, Coimbatore-641008.
[4]Assistant Professor, Department of Mathematics, Kongunadu Arts and Science College (Autonomous), Coimbatore-641029.

ABSTRACT

Thepurposeofthisarticleistoinvestigatethespacesnamely*KSgp*[*KSgsp*]-regularspaces, *KSgp*[*KSgsp*]- normal spaces by utilizing *KSgp*[*KSgsp*]-open sets in Kasaj Topological Spaces.Also we discuss theirrelationship with existing concepts in kasaj topological spaces.

Keywords:*KSg*[*KSgp*,*KSgsp*]-regularspacesand*KSg*[*KSgp*,*KSgsp*]-normalspaces.

AMSClassification:54A05,54B05,54A99.

DOI: 10.53555/ecb/2022.11.01.64

1. INTRODUCTIONANDPRELIMINARIES

In1970,Levine[3]introducedtheconceptofgeneralizedclosedsetsintopologicalspaces.This was introduced as generalization of closed sets in topological space and interesting results were proved. LellisThivagaretal.[2]introducednanotopologicalspaceswithrespecttoasubsetXofauniversal set U which is defined in terms of lower and upper approximation of X. In 2019, Chandrasekar [1] introduced a new topology namely, micro topology which is extension of nano topological space.A partial extension of micro topological space namely kasaj topological spaces was introduced by Kashyap G.RachchhandSajeed[4]Further, theauothersintroducedtheconceptofkasajgeneralizedclosedsetsin kasaj topological spaces.Sathishmohan et al.[5] introduced and investigates the new type of closed sets knownas*KSgp*(*KSgsp*)-closedsetsinKasajtopologicalspaces.InthispaperweshalldefineKS-regular spaces, KS-normal spaces, KS pre-regular spaces, KS pre-normal spaces, KSβ-regular spaces, KSβ- normalspaces,*KSgp*[*KSgsp*]-regularspaces,*KSgp*[*KSgsp*]-normalspacesinkasajtopologicalspaces and obtain some of their basic results.

Definition1.1.*AsubsetPofUin*$(U,\tau R(X),KSR(X))$*iscalled*

(1) *KS-closedset*[4]*if*$KS_{cl}(P)=P$*.ThecomplementofKS-closedsetisKS-opensetinU.*
(2) *KSpre-closedset*[4] *if*$KS_{cl}(KS_{int}(P))\subseteq P$*.ThecomplementofKS-preclosedsetisKS-pre- open set in U.*
(3) *KSα-closedset*[4]*if*$KS_{cl}(KS_{int}(KS_{cl}(P)))\subseteq P$*.ThecomplementofKS$\alpha$-closedsetisKS-$\alpha$- open set in U.*
(4) *KSβ-closedset*[4] *if*$KS_{int}(KS_{cl}(KS_{int}(P)))\subseteq P$*.ThecomplementofKS$\beta$-closedsetisKS-$\beta$- open set in U.*

Definition 1.2.[4] *A subset P of U in* $(U,\tau R(X),KSR(X))$ *is called a Kasaj-generalized-closed set (briefly* KS_g*-closed) if* $KS_{cl}(P)\subseteq V$ *whenever* $P\subseteq V$ *and V is KS-open set in U. The complement of KSg-closed set is KSg-open set in U.*

Definition1.3.[5]*AsubsetPofUin*$(U,\tau R(X),KSR(X))$*iscalledaKasaj-generalized-pre-closedset (brieflyKS*$_{gp}$*-closed) if* $KS_{pcl}(P)\subseteq V$ *whenever* $P\subseteq V$ *and V is KS-open set in U. The complement of KSgp-closed set is KSgp-open set in U.*

Definition 1.4.[5] *A subset P of U in* $(U,\tau R(X),KSR(X))$ *is called a Kasaj-generalized-semi-pre- closed set (briefly* KS_{gsp}*-closed) if* $KS_{spcl}(P)\subseteq V$ *whenever* $P\subseteq V$ *and V is KS-open set in U. The complement of KSgsp-closed set is KSgsp-open set in U.*

2. Propertiesof*KSgp*[*KSgsp*]-RegularSpaces

In this section, we introduce the new class of spaces namely *KSgp*[*KSgsp*]-Regular Spaces in KasajTopological Spaces.By using *KSgp*-open sets and studied some of their properties.

Definition2.1.*AKasajTopologicalSpacesUiscalled*

(i) *KS-T*3*(brieflyKS-regular)spaceifforeachKS-closedsetFandapointx*$\notin$*F,therearedisjoint KS-open sets G and H such that* $x\in G$ *and* $F\subseteq H$.
(ii) *KSpre-T*3*(brieflyKSpre-regular)spaceifforeachKSpre-closedsetFandapointx*$\notin$*F,there aredisjointKSpre-opensetsGandHsuchthatx*$\in$*GandF* $\subseteq$*H.*
(iii) *KSβ-T*3*(brieflyKSβ-regular)spaceifforeachKSβ-closedsetFandapointx*$\notin$*F,thereare disjointKSβ-opensetsGandHsuchthatx*$\in$*GandF*$\subseteq$*H.*
(iv) *KSgp-T*3 *(brieflyKSgp-regular)spaceifforeachKSgp-closedsetFandapointx*$\notin$*F,there aredisjointKSgp-opensetsGandHsuchthatx*$\in$*GandF*$\subseteq$*H.*
(v) *KSgsp-T*3 *(brieflyKSgsp-regular)spaceifforeachKSgsp-closedsetFandapointx*$\notin$*F,there aredisjointKSgsp-opensetsGandHsuchthatx*$\in$*GandF*$\subseteq$*H.*

Theorem2.2.*InaKasajTopologicalSpaces*$(U,\tau R(X),KSR(X))$.*Then*

(i) *EveryKS-regularspaceisKSgp-regular.*
(ii) *EveryKSpre-regularspaceisKSgp-regular.*
(iii) *EveryKSα-regularspaceisKSgp-regular.*
(iv) *EveryKSg-regularspaceisKSgp-regular.*

Proof:

i)LetUbeaKS-regularandFbeaKS-closedsetnotcontainingximpliesFbeaKSgp-closedsetnot containingx.AsUisKSgp-regular,thereexistsKSgp-opensetGandHsuchthatx$\in$*GandF*$\subseteq$*H. Therefore U is KSgp-regular.*

Proofof(ii)-(iv)aresimilarto(i).

Conversesoftheabovetheresultsneednotbetrueasshowninthefollowing example.

Example2.3.$LetU=\{a,b,c,d,e\},withU\backslash R=\{\{a,d\},\{b,c\},\{e\}\}andX=\{a,e\}$*.Thenthenanotopology,*$\tau R(X)=\{U,\varphi,\{e\},\{a,d,e\},\{a,d\}\}$*.Let*$S=\{d\},S'=\{a,b,c,e\}$*.Then*$x=\{d\},F=\{a,d,e\}$and A={a,e},B={d}itisKSgp-regularspacesbutnotinKS-regularspaces,KSpre-regular spaces, KSα-regular spaces, KSg-regular spaces.

Theorem2.4.*EveryKSgp-regularspaceisKSgp-T2space.*

Proof: LetUbeaKSgp-regularspaceandx,y∈ Uwithx /= y.SinceUisKSgp-regular,thesubset {y} is KSgp-closed.Sincex≠{y}andUisKSgp-regularspace,thereexistsdisjointKSgp-opensetsGand Hsuchthatx∈ G,y∈ HandG∩H =φ.HenceUisKSgp-T2 space.

Theorem2.5.*IfUisaKSgp-regularspaceandVisasubspaceofU,thenVisalsoKSgp-regular space.*
Proof: Let(U,τR(X),KSR(X)) be a KSgp-regular space and (V,τR(Y),KSR(Y)) be

a subspace of U. To prove thatVisKS$_{gp}$*-regular,letx∈VandFbeaKS*$_{gp}$*-closedsetinVsuchthatx∉F.SoF=V∩KS*$_{gpcl}(F)$*.*
Sincex∉F,weseethatx∉KS$_{gpcl}(F)$*.SinceUisKS*$_{gp}$*-regularspace,thereexistsdisjointKS*$_{gp}$*-opensetsGandHinUsuchthatKS*$_{gpcl}(F)$
⊆G,x∈H.NowF⊆KS$_{gpcl}(F)$*⊆G.SinceF⊆V,F⊆V∩G.Sincex∈ Vandx∈ H,x∈V∩ H.Further(V∩G)∩(V∩H) =φ.SinceG∩H =φ.ThusV∩ G andV∩ HareKSgp-opensetsinV,x∈ V∩H,F⊆ V∩ Gand(V∩G)∩(V∩H) = φ.HenceVisKSgp-regular space.*

Theorem 2.6. *A Kasaj Topological Spaces U is KSgp-regular space iff for any x ∈U and a KSgp- neighbourhoodNofx,thereisanKS*$_{gp}$*-opensetFsuchthatx∈F⊆KS*$_{gpcl}(F)$ *⊆N.*
Proof: AssumethatUisKSgp-regularspaceandNisaKSgp-neighbourhoodofx.Then N^cisaKSgp-closed setandx∉N^c.SinceUisKSgp-regular,thereexistsdisjointKSgp-opensetsFandGsuchthatx∈FandN^c⊆G.SoG^c⊆N.SinceF∩G=φ,F⊆G^{c}thisimpliesthatKS$_{gpcl}$(F)⊆G^c. SinceG^{c}isaKS$_{gp}$-closedset.Thusx∈F⊆KS$_{gpcl}$(F)⊆N.

Conversely, assume that the given condition is satisfied.Let H be a KSgp-closed set in U and x ∉H. Since H^c *is KSgp-neighbourhood of x, by assumption, there is an KSgp-open set L such that x ∈L ⊆KS*$_{gpcl}(L)$*⊆H*^{c}*.ThusthedisjointKS*$_{gp}$*-opensetLand[KS*$_{gpcl}(L)]^c$*containxandHrespectively. Hence U is KSgp-regular space.*

Theorem2.7. InaKasajTopologicalSpaces(U,τR(X),KSR(X)).TheneveryKS-regularspace(KS pre-regularspace,KSα-regularspace,KSβ-regularspace,KSg-regularspace,KSgp-regularspace)is*KSgsp-regular*.

Proof:

ItisobviousfromTheorem2.2.

Conversesoftheabovetheresultsneednotbetrueasshowninthefollowingexample.

Example2.8.$LetU=\{a,b,c,d,e\},withU\backslash R=\{\{a,b\},\{c,d\},\{e\}\}andX=\{a,e\}$*.Thenthenanotopology,*$\tau R(X)=\{U,\varphi,\{e\},\{a,b,e\},\{a,b\}\}$*.Let*$S=\{a\},S'=\{b,c,d,e\}$*.Then*$x=\{e\},F=\{d,e\}$andA ={d},B={e}itisKSgsp-regularbutnotinKS-regularspaces,KSpre-regularspaces,KS$_{\alpha}$-regularspaces,KS$_{\beta}$-regularspaces,KS$_{g}$-regularspaces,KS$_{gp}$-regularspaces.

Theorem2.9.*EveryKSgsp-regularspaceisKSgsp-T2space.*

Proof:

Let U be a KSgsp-regular space and x, y ∈U with x /= y.Since U is KSgsp-regular, the subset {y}is KSgsp-closed.Sincex/={y}andUisKSgsp-regularspace,thereexistsdisjointKSgsp-opensetsGand HsuchthatxϵG,yϵHandG∩H=φ.HenceUisKSgsp-T2 space.

Theorem2.10.*IfUisaKSgsp-regularspaceandVisasubspaceofU,thenVisalsoKSgsp-regular space.*
Proof: Let(U,τR(X),KSR(X))beaKSgsp-regularspaceand(V,τR(Y),KSR(Y))beasubspaceofU.To provethatVisKSgsp-regular,letx∈VandFbeaKSgsp-closedsetinVsuchthatx∉F.SoF=V∩KS_{gspcl}(F).Sincex∉F,weseethatx∉KS_{gspcl}(F).SinceUisKS$_{gsp}$ -T$_3$space,thereexistsdisjointKS$_{gsp}$-opensetsGandHinUsuchthatKS_{gspcl}(F)⊆G,x∈H.NowF⊆KS_{gspcl}(F)⊆G.SinceF⊆*V,F*⊆*V*∩ *G.Sincex*∈*Vandx*∈*H,x*∈*V*∩ *H.Further(V*∩*G*)∩(*V*∩*H*) =*φ.SinceG*∩*H=φ. ThusV*∩ *GandV*∩ *HareKSgsp-opensetsinV,x*∈*V*∩*H,F*⊆*V*∩ *Gand(V*∩*G*)∩(*V*∩*H*) =*φ. Hence V is KSgsp-regular space.*

Theorem 2.11.*A Kasaj Topological Spaces U is KSgsp-regular space iff for any x ∈U and a KSgsp- neighbourhoodNofx,thereisanKS$_{gsp}$-opensetFsuchthatx*∈*F*⊆*KS_{gspcl}(F)* ⊆*N.*
Proof: Assume that U is KSgsp-regular space and N is a KSgsp-neighbourhood of x.Then $N^c$is a KSgsp-closed setandx∉N^c.SinceUisKSgsp-T3,thereexistsdisjointKSgsp-opensetsFandGsuchthatx∈F andN^c⊆G.SoG^c⊆N.SinceF∩G=φ,F⊆G^cthisimpliesthatKS_{gspcl}(F)⊆G^c.SinceG^cisaKS_{gsp}-closedset.Thusx∈F⊆KS_{gspcl}(F)⊆N.Conversely,assumethatthegivenconditionissatisfied.LetHbea KSgsp-closedsetinUandx∉H.SinceH^cisKSgsp-neighbourhoodofx,byassumption,thereisanKSgsp-opensetLsuchthatx∈L⊆KS_{gspcl}(L)⊆H.ThusthedisjointKS$_{gsp}$-opensetLand[KS_{gspcl}(L)]containxandH respectively.Hence U is KSgsp-regular space.

3.Propertiesof*KSgp*[*KSgsp*]-NormalSpaces

Inthissection,wedefinedandstudiedtheconceptof*KSgp*[*KSgsp*]-normalSpacesinKasajTopological Spaces and investigated its properties with some of the existing results.

Definition3.1.*AKasajtopologicalspacesUiscalled*

(i) *KS-T4space (briefly KS-normal) if for each pair A and B of disjoint KS-closed sets in U, there aredisjointKS-opensetsGandHsuchthatA⊆GandB⊆H.*
(ii) *KS pre-T4(briefly KS pre-normal)space if for each pair A and B of disjoint KS pre-closed sets inU,therearedisjointKSpre-opensetsGandHsuchthatA⊆GandB⊆H.*
(iii) *KSβ-T4(brieflyKSβ-normal)spaceifforeachpairAandBofdisjointKSβ-closedsetsinU, therearedisjointKSβ-opensetsGandHsuchthatA⊆GandB⊆H.*
(iv) *KSgp-T4 (brieflyKSgp-normal)spaceifforeachpairAandBofdisjointKSgp-closedsetsin U,therearedisjointKSgp-opensetsGandHsuchthatA⊆GandB⊆H.*
(v) *KSgsp-T4(brieflyKSgsp-normal)spaceifforeachpairAandBofdisjointKSgsp-closedsets inU,therearedisjointKSgsp-opensetsGandHsuchthatA⊆GandB⊆H.*

Theorem3.2.*InaKasajTopologicalSpaces*(*U,τR*(*X*),*KSR*(*X*)).*Then*

(i) *EveryKS-normalspaceisKSgp-normal.*

(ii) *EveryKSpre-normalspaceisKSgp-normal.*

(iii) *EveryKSα-normalspaceisKSgp-normal.*

(iv) *EveryKSg-normalspaceisKSgp-normal.*

Proof:i) Let U be a KS-normal space and F and G be arbitrary pair of disjoint KS-closed sets.Since everyKS-closed set is (KS pre-closed, KSα-closed, KSg-closed) KSgp-closed set, F and G are (KS pre-closed, KSα-closed,KSg-closed)KSgp-closedsetsandUisKSgp-normal,thereforethereexistsdisjoint(KS pre-open, KSα-open, KSg-open) KSgp-open sets L and M such that F ⊆ L and G ⊆ M. Thus for every pairofdisjointKS-closed(KSpre-closed,KSα-closed,KSg-closed)KSgp-closedsetsFandGthere existsdisjoint(KSpre-open,KSα-open,KSg-open)KSgp-opensetsLandMsuchthatF⊆LandG⊆ M. Hence U is (KS pre-normal, KSα-normal, KSg-normal) KSgp-normal space. Proof of (ii)-(iv) are similar to (i).

Conversesoftheabovetheresultsneednotbetrueasshowninthefollowingexample.

Example3.3.*LetU={a,b,c,d,e},withU\R={{a,d},{b,c},{e}}andX={b,e}.Thenthenanotopology,τR(X)={U,φ,{e},{b,c,e},{b,c}}.LetS={b},S'={a,c,d,e}.ThenF={b},G={a,d}*andA = {b}, B = {a,c,d,e}it is KSgp-normal spaces, but not in KS-normal spaces, KS pre-normal spaces, KSα-normal spaces, KSg-normal spaces.

Theorem3.4.*EveryKSgp-normalspaceisKSgp-regularspace.*

Proof: LetUbeaKSgp-normalspace.ThenUisKSgp-normalspaceaswellasKSgp-T1space.Toshowthat UisKSgp-regular,itsufficestoshowthatthespaceisKSgp-regular.LetFbeaKSgp-closedsubsetof UandletxbeapointofUsuchthatx∉F.SinceUisKSgp-T1 space,{x}isaKSgp-closedsebsetof Usuchthat{x}∩F=φ.ThenthereexistsKSgp-opensetsGandHsuchthat{x}⊆G,F⊆HandG∩H=φ.Also{x}⊆Gthisimpliesx∈G.Thusthereexists KSgp-opensetsG,Hsuchthatx∈G,F⊆HandG∩H=φ.HencetheUisKSgp-regularspace.

Theorem3.5.*AKSgp-closedsubspaceforaKSgp-normalspaceisKSgp-normal.*

Proof: Let V be a KSgp-closed subspace for a KSgp-normal space.Let A and B be disjoint KSgp-closed subsetsof V. Since V is KSgp-closed set in U, A and B are also KSgp-closed set in U. Since U is KSgp-normal,there exists disjoint KSgp-open sets G and H in U such that A ⊆G and B ⊆H. Since V contains both A andB,wehaveA⊆V∩G,B⊆V∩Hand(V∩G)∩(V∩H) =φ.SinceGandHareKSgp-opensetin U,(V∩ G)and(V∩ H)areKSgp-opensetinV.ThusinthesubspaceV,wehavedisjointKSgp-open sets(V∩ G)containingAand(V∩ H)containingB.HenceVisKSgp-normal.

Theorem3.6.*AKasajTopologicalSpacesUisKSgp-normalspaceiffforanyKSgp-opensetA containingaKS*$_{gp}$*-closedsetF,thereexistsanKS*$_{gp}$*-opensetGsuchthat*$F \subseteq G \subseteq KS_{gpcl}(G) \subseteq A$.

Proof:*Assume that U is KSgp-normal.Since F and* A^c *are disjoint and KSgp-closed sets in U, there exists disjoint KSgp-open sets G and H such that F ⊆G and* $A^c \subseteq H$*. Since G and H are disjoint,* $G \subseteq H^c$*, we have* $KS_{gpcl}(G) \subseteq H^c \subseteq A$*. Thus we have an* KS_{gp}*-open sets G such that* $F \subseteq G \subseteq KS_{gpcl}(G) \subseteq A$*. Conversely,assumethattheconditionholds.LetAandBbedisjointKSgp-closedsetinU.Since*B^c*isKSgp-openandcontainstheKSgp-closedsetA,byassumption,thereisanKSgp-opensetVsuch that*$A \subseteq V \subseteq KS_{gpcl}(V) \subseteq B^c$*,thuswehave*$KS_{gp}$*-opensets*$A \subseteq V$*and*$[KS_{gpcl}(V)]^c$*.HenceUis KSgp-normal space.*

Theorem3.7.*InaKasajTopologicalSpaces*$(U,\tau_R(X),KS_R(X))$. *TheneveryKS-normalspace(KS pre-normal space, KSα-normal space, KSβ-normal space, KSg-normal space, KSgp-normal space) is KSgsp-normal.*

Proof: ItisobviousfromTheorem3.2.

Conversesoftheabovetheresultsneednotbetrueasshowninthefollowingexample.

Example3.8.*LetU*$=\{a,b,c,d,e\}$*,withU\R*$=\{\{a,b\},\{c,d\},\{e\}\}$*andX*$=\{a,e\}$*.Thenthenanotopology,*$\tau_R(X)=\{U,\varphi,\{e\},\{a,b,e\},\{a,b\}\}$*.LetS*$=\{a\}$*,*$S'=\{b,c,d,e\}$*.ThenF*$=\{c\}$*,G*$=\{e\}$and A= {a,b,c,d}, B = {e}it is KSgsp-normal spaces, but not in KS-normal spaces, KS pre-normal spaces, KS_α-normal spaces, KS_β-normal spaces, KS_g-normal spaces.

Theorem3.9.*EveryKSgsp-normalspaceisKSgsp-regularspace.*

Proof: LetUbeaKSgsp-normalspace.ThenUisKSgsp-normalspaceaswellasKSgsp-T1 space.Toshow that U is KSgsp-regular, it suffices to show that the space is KSgsp-regular.Let F be a KSgsp-closedsubset of U and let x be a point of U such that x ∉F. Since U is KSgsp-T1space, {x}is a KSgsp-closed sebsetofUsuchthat{x}∩F=φ.ThenthereexistsKSgsp-opensetsGandHsuchthat{x}⊆G,F⊆HandG∩H=φ.Also{x}⊆Gthisimpliesx∈G.Thusthereexists KSgsp-opensetsG,Hsuchthatx∈G,F⊆HandG∩H=φ.HencetheUisKSgsp-regularspace.

Theorem 3.10. *A Kasaj Topological Spaces U is KSgsp-normal space iff for any KSgsp-open set A containing a* KS_{gsp}*-closed set F, there exists an* KS_{gsp}*-open set G such that* $F \subseteq G \subseteq KS_{gspcl}(G) \subseteq A$.

Proof:*Assume that U is KSgsp-normal. Since F and* A^c *are disjoint and KSgsp-closed sets in U, there exists disjoint KSgsp-open sets G and H such that* $F \subseteq G$ *and* $A^c \subseteq H$*. Since G and H are disjoint,* $G \subseteq H^c$*, wehave*$KS_{gspcl}(G) \subseteq H^c \subseteq A$*.ThuswehaveanKS*$_{gsp}$*-opensetsGsuchthat*$F \subseteq G \subseteq KS_{gspcl}(G) \subseteq A$*.*
Conversely,assumethattheconditionholds.LetAandBbedisjointKSgsp-closedsetinU.SinceB^c *isKSgsp-openandcontainstheKSgsp-closedsetA,byassumption, thereisanKSgsp-opensetVsuch that*$A \subseteq V \subseteq KS_{gspcl}(V) \subseteq B^c$*,thuswehaveKS*$_{gsp}$*-opensets*$A \subseteq V$*and*$[KS_{gspcl}(V)]^c$*.HenceUisKSgsp-normalspace.*

Theorem3.11.*AKSgsp-closedsubspaceforaKSgsp-normalspaceisKSgsp-normal.*

Proof: LetVbeaKSgsp-closedsubspaceforaKSgsp-normalspace.LetAandBbedisjointKSgsp-closed subsetsofV.SinceVisKSgsp-closedsetinU,AandBarealsoKSgsp-closedsetinU.SinceUis KSgsp-normal, there exists disjoint KSgsp-open sets G and H in U such that A ⊆ G and B ⊆H. Since V containsbothAandB,wehaveA⊆V∩G,B⊆V∩Hand(V∩G)∩(V∩H)=φ.SinceGandHareKSgsp-opensetinU,(V∩G)and(V∩H)areKSgsp-opensetinV.ThusinthesubspaceV,wehavedisjointKSgsp-opensets(V∩G)containingAand(V∩H)containingB.HenceVisKSgsp-norma**l.**

CONCLUSION

In the existing paper, we had introduced and studied the concept of KSgp[KSgsp]-Regular space, KSgp[KSgsp]-Normal space using the concept of KSgp[KSgsp]-open sets in kasaj topological spaces. This shall be extended in the future research with someapplications.

REFERENCES

[1] Chandrasekar,OnMicroTopologicalSpaces,JournalofNewTheory,1(26),2019, 23-31.

[2] LellisThivagar.M, Carmel Richard, On Nano Forms of Weakly Open Sets, International Journal of Mathematics And Statistics Invention, 1(1), 2013, 31-37.

[3] Levine.N,GeneralizedClosedSetsonTopology,RenticontiDelCircoloMathematicsDiPaletmo,19(2),1970,89-96.

[4] Rachchh.K.G,Ghanchi.S.I,Soneji.A. and Ghanchi.S.I,OnKasaj Generalized Closed Sets in Kasaj Topological Spaces, Journal of Emerging Technologies and Innovative Research, 7(12),2020,646-651.

[5]Sathishmohan.P, Sindhu.M, Lavanya.K, Rajalakhmi.K, On Kasaj Generalized Pre Closed Sets and Kasaj General- ized Semi Pre Closed Sets in Kasaj Topological Spaces, Journal of Natural Sciences, 13(73), 2022, 47031-47037.