ReviewForm3

JournalName:	AsianResearchJournalofMathematics
ManuscriptNumber:	Ms_ARJOM_130005
TitleoftheManuscript:	UltrafilterinGraphTheory:RelationshiptoTree-decomposition
TypeoftheArticle	ShortResearchArticle

PART 1:Comments

	Reviewer'scomment	Author'sFeedback(Pleasecorrectthemanuscriptand highlightthatpartinthemanuscript.Itismandatory thatauthorsshouldwritehis/herfeedbackhere)
Pleasewriteafewsentencesregarding theimportance ofthismanuscriptfor thescientificcommunity.Aminimumof 3-4sentencesmayberequiredforthis part.	Ultrafilterconstructionsondifferentcategoriesofmathematicalobjectssuchas partialsets,Booleanalgebras,graphs,etcareanactiveresearchtopicwhere themainchallengeiswhetheranultrafilterofacertaintypeexistsornot.The articleunderreviewaimstodiscussthestructureofultrafilteronthecategory ofgraphsintermsofadualrelationshipwithtreewidthandextensionof propertiesfromBooleansettingtographsetting.	
Isthetitleofthearticlesuitable? (If notpleasesuggestanalternative title)	No.Irecommend "UltrafilterinGraphTheoryviathesettingoftree-decomposition"	

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Istheabstractofthearticle comprehensive? Doyou suggestthe addition(ordeletion)ofsomepointsin thissection?Pleasewriteyour suggestionshere.	No.TherearepointsinAbstractwhichareNotrelatedtothecurrentarticle. Thesentence“Ourgoalistoextendthisresearchinthefuturebydelvingdeeper intothepropertiesofUltrafiltersongraphs,particularlyfocusingonuncovering uniquecharacteristicsthatmanifestinvariousgraphclasses” shouldberemoved.Becauseithasnothingtodowiththisresearch.	
Isthemanuscriptscientifically,correct? Pleasewritehere.	Severalmathematicaltoolsandconceptsareappliedwithoutanyappropriate explanationswhichmakedifficulttoreadthisarticle.Severalclaimsare addressedwithoutprovidingenoughmathematicalreasoning.Thereforethe currentpresentationofthisarticleneedstoberewrittenintermsofthe followingremarks: CommentstoAuthor: 1.Oneimportantissueisusingthephrase“metric”fortheparameter “tree width”inAbstractandIntroduction.Ifthisisametricstructureonthespaceof graphs,thenanexplicitdefinitionneedstobeaddedintheSection:Definitions andNotations.Otherwise,usingthephrase“metric”foraparameter doesnot makesense. 2.Whatisthemeaningof“anaturaldefinitionofultrafiltersongraphs”in Abstract?Doesexistanun-naturaldefinition?Theadjective“natural”shouldbe removed. 3.Replace“Ultrafilters”with“ultrafilters”inthewholepaper. 4.Thesentence“OurgoalistoextendthisresearchinthefuturebydelvingdeeperintothepropertiesofUltrafiltersongraphs,particularlyfocusingonuncoveringuniquecharacteristicsthatmanifestinvariousgraphclasses.”in Abstracthasnothingtodowiththecurrentwork.SoitshouldberemovedOr replacedtoConclusionpart. 5.Inthefirstparagraphin Introduction,page1,thesentence“Width parameterspertaintometricsderivedfromtree-likestructures,commonly referredtoasgraphdecompositions.”isunclearandgenerates misunderstanding.Itislikeheauthorsaystheexistenceofacorrespondence betweenacertainclassofmetricsandgraphdecompositions.Isthatright?I recommendrewritingthissentenceandprovidinganappropriatereferencefor it.	

ReviewForm3	6.Anexplicitdefinitionfortheconcept“treewidth”shouldbeaddedasa sentencebeforetheconcept“Tangle”inthefirstparagraphinIntroduction, page1. 7.Inthesecondparagraphin Introduction,page1,thesentence“Simplyput,a filtercanbeinterpretedasacollectionofsetscontainingaspecificelement...” ismeaningless.Itshouldbereplacedbyanexplicitdefinitionfortheconcept “Filter”. 8.An appropriatereferenceforthestatement“Inthedomainof Boolean algebra,maximalfiltersarereferredtoasultrafilters”isessentialtobe provided. 9.Replacethephrase“naturaldefinition”with“definition”inwholepaper,and, removethephrase“Itistrulyremarkable”inthelastparagraphinIntroduction. 10.Removethesentence“Ourgoalistoextendthisresearchinthefutureby delvingdeeper....”fromIntroductionorreplaceittotheConclusion. 11.Thefirstparagraphin Section2,namely,“AgraphGisamathematical structurecomposedofnodes(vertices)connectedbyedges,representing relationshipsor.....”shouldberewrittenasaDefinition. 12.Havingtwoshortsubsections fortheSectionisnecessary?Irecommend removingthesedivisions. 13.Thesentence“Asmentionedintheintroduction,FiltersandUltrafiltersare fundamentalconceptsinmathematics.”inpage2isnotnecessaryandshould bedeleted. 14.Appropriatereferencesforthesentence“Thecomplementofanfilterina Booleanalgebra(X,∪,∩)isreferredtoasanidealinaBooleanalgebra (X,∪,∩).”shouldbeadded. 15.AppropriatereferencesforDefinition1shouldbeadded.	

	16.Appropriatereferencesforthesentence“atangleinagraphGisawayto describehowtheverticescanbeseparated intodistinctgroupsbasedoncertain conditions.”insubsection2.2shouldbeadded. 17.Theparagraph“AseparationofagraphGisapairofsubgraphs ...”in subsection2.2shouldberewrittenasaDefinition. 18.Thesentence“inthefieldofgraphwidthparameters,dualitytheoremsare frequentlydiscussed.”isunclearanditneedstoberewrittentogetherwith appropriatereferences. 19.Thesentence“Thedefinitionofpathtangle,which hasadeepconnection withpath-decompositions,areoutlinedbelow.”isnotnecessaryanditshould bedeleted. 20.Appropriatereferencesforthesentence“Apath-decompositionisatree structurethatrestrictstree-decompositionstoapath-likestructure.”shouldbe added. 21.AppropriatereferencesforDefinition3shouldbeadded. 22.AnexplicitproofforTheorem2shouldbeadded.Thistheoremisthemain toolfortherestofthiswork,thereforeitisessentialtohaveitsprooftogether withappropriatereferences. 23.TheimportanceofTheorem3fortherestofthisworkshouldbeexplained inaparagraphattheendofthesubsection2.2. 24.Irecommendtodoublechecktherefernce[35]anditsrelationtoTheorem 3? IthinkTheorem3 needsanotherappropriatereferencesoritsproofshould beaddedinthispaper. 25.Thesentence“Wenaturallyextendthedefinitionfrom Booleanalgebrasto graphs.”inthefirstparagraphinSection3isIncorrect.Howisthatpossible?An explicitproofortheexistenceofafunctorfromCategoryofBooleanalgebras totheCategoryofgraphs(oralgebrasofgraphs)andthestructureofthis functorisessentialtobeadded.Otherwiseitdoesnotmakesensetoextend conceptsforBooleanalgebrastothespaceofgraphs.	

	26.WithoutprovidinganexplicitrelationbetweenCategoryofBooleanalgebras andCategoryofgraphs,Definition4isNotwell-defined.Forwhichclassof graphsdoesworkthisdefinition?Isitvalidforinfinitegraphs,andmulti-edge graphs? 27.ThevalidityofTheorem4canbeevaluatedwhentheauthorcouldfirst introduceawell-definedfunctorfromCategoryofBooleanalgebrastoCategory ofgraphsoralgebrasofgraphs,andthentheauthorshouldcheckwhichtypeof propertiescanbeextendedbythatfunctor. 28.TheproofofTheorem4isNotworkingforinfinitegraphsandgraphswith multi-edges. 29.AproofforTheorem5shouldbeadded. 30.AproofforTheorem6shouldbeadded. 31.InSection5,theparagraph“TwosubgraphsAandBtouchifeitherthei r vertexsetshaveanon-emptyintersection(V(A)∩V(B)≠∅),orthereexistsan edgee∈E(G)thatconnects...”shouldberewrittenasaDefinitionwith appropriatereferences. 32.Insection5,theparagraph“Now,wedefineaG-brambleofGasafamilyB consistingofconnectedsubgraphsofGinwhichanytwosubgraphswithin...” shouldberewrittenasaDefinitionwithappropriatereferences. 33. ProofofTheorem8isrelatedtothevalidityofTheorem4.Irecommendthe authorcouldfixacertainclassofgraphsandthenworkontheconstructionofa suitablefunctortoextendpropertiesfromBooleanalgebrastothatclassof graphs. 34.InSection6,thesentence“Weinvestigatethecharacteristicsofultrafilters ongraphsacrossvariousgraphclasses.”isverygeneralanditneedstobe revised. 35.Insection6,thesentence“...exploretopicssuchastheUltrafilterAxiomof Choiceandthefiniteintersectionpropertywithintheframeworkofultrafilters ongraphs.”needsadoublecheck.Becausetheauthorisalreadyusing Axiomof ChoicebyextendingpropertiesfromBooleanalgebrastoGraphTheory.	

Arethereferencessufficientandrecent? Ifyouhavesuggestionsofadditional references,pleasementionthemin the reviewform.	Therearesevera lpapersinthelistofReferenceswhicharenotrelatedtothis article.Referencesarenotappliedappropriatelyinthetext.Theauthorshould rigorouslydoublecheckthislistandthenkeepsonlyrelatedonesandremoves therest.	
Isthelanguage/Englishqualityofthe articlesuitableforscholarly communications?	Average	
Optional/Generalcomments	Theorems2,3,5,6areNotproved.Theauthorhastheideaofextending propertiesfromBooleanalgebrastothespaceofgraphswhichisincorrectin generalanditneedsfundamentalconditionsandseveralmathematical structurestohavethepossibilityofextendingsomepropertiesfromBoolean algebrastographs.TheauthordoesNotprovideanexplicitproofforthe existenceandthestructureofarequiredfunctorfromCategoryofBoolean algebrastotheCategoryofgraphs(oralgebrasofgraphs).Otherwise,Theorems 4,8asthemainresultofthisarticlecannotbeproved. MoreexplanationsareprovidedasCommentstoAuthorintheprevious parts.	

PART 2:

	Reviewer's comment	**Author's comment***(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)*
Are there ethical issues in this manuscript?	*(If yes, Kindly please write down the ethical issues here in details)*	

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