

SPECIMEN FORMAT FOR THESES OF MONTH

Faculty : School of Physical Sciences and Computational Sciences

Department : Mathematics

Branch/ Area: : Topology

Sub Subject Heading: : General Topology

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Title of the thesis : A New Form of Generalized Closed Sets in General Topology

(i) In Roman Script -

(ii) In roman Script -

Nomenclature of Degree: : Ph.D. Mathematics

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Name of Supervisor : Dr.A.Parvathi

Designation of Supervisor : Former Professor of Mathematics and Former Dean,
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Centre/department/school in which research was conducted : Department of Mathematics

University's Name & Address : Avinashilingam Institute for Home Science and Higher Education for Women

Abstract within 300 words:

The endeavor of the thesis is to introduce the concept of $\psi^* \alpha$ -closed sets in topological and bitopological spaces. Their association with other existing closed sets, properties and characterizations are analyzed under various concepts such as continuity, irresoluteness and homeomorphisms in topological and bitopological spaces. It is proved that in topological space, finite union of $\psi^* \alpha$ -closed sets is $\psi^* \alpha$ -closed and arbitrary intersection of $\psi^* \alpha$ -closed sets is $\psi^* \alpha$ -closed. In bitopological space finite union of (i, j) - $\psi^* \alpha$ -closed sets is (i, j) - $\psi^* \alpha$ -closed but intersection of two (i, j) - $\psi^* \alpha$ -closed sets need not be (i, j) - $\psi^* \alpha$ -closed. Five new spaces are constructed in topological spaces and their properties are analyzed. Four new spaces are introduced in bitopological spaces and their interrelations are derived. It is shown that, $\psi^* \alpha$ -continuity is not preserved under composition of maps. But by changing the topological spaces $\psi^* \alpha$ -continuity is preserved under composition.

The extension of homeomorphisms namely, $\psi^* \alpha$ -homeomorphisms and $\psi^* \alpha \mathcal{C}$ -homeomorphisms are introduced in topological and bitopological spaces.. The group property of $\psi^* \alpha \mathcal{C}$ -homeomorphisms is analyzed. Quasi $\psi^* \alpha$ -open maps, Quasi $\psi^* \alpha$ -closed maps and $\psi^* \alpha$ -quotient maps are introduced in topological spaces. Further $\psi^* \alpha$ -compactness and $\psi^* \alpha$ -connectedness are also discussed in topological spaces.

i) Major objectives :

The major objective is to find weaker forms of closed sets which will satisfy certain conditions which are not generally satisfied by closed sets.

ii) Hypothesis: -

iii) Methodology :

A new form of generalized closed sets called $\psi^*\alpha$ -closed sets is studied by the following methods

- Analytical comparison with existing closed sets.
- Proving with illustrations.
- Analysis of preservation of topological properties.
- Obtaining Characterization theorems.

iv) Findings:

The thesis is to investigate a new form of generalized closed sets called $\psi^*\alpha$ -closed sets in topological and bitopological spaces.

The preliminary definitions and notations used in the thesis are presented in chapter 1.

In chapter 2, $\psi^*\alpha$ -closed sets and $\psi^*\alpha$ -open sets are introduced. Their properties and characterizations are studied. It is observed that $\psi^*\alpha$ -closed sets form a topology and the closure operator defined for $\psi^*\alpha$ -closed sets satisfies Kuratowski closure axioms. As an application of $\psi^*\alpha$ -closed sets new spaces namely, ${}_{\psi^*\alpha}T_c$ -space, ${}_{\psi^*\alpha}T_\alpha$ -space, ${}_{g\alpha}T_{\psi^*\alpha}$ -space, ${}_{\alpha g}T_{\psi^*\alpha}$ -space and ${}_{\psi g}T_{\psi^*\alpha}$ -space are defined and their interrelations are obtained.

The concepts of $\psi^*\alpha$ -continuity, quasi $\psi^*\alpha$ -continuity, perfectly $\psi^*\alpha$ -continuity, totally $\psi^*\alpha$ -continuity, strongly $\psi^*\alpha$ -continuity and contra $\psi^*\alpha$ -continuity are introduced in chapter 3. Properties, characterizations and interrelations between these maps are obtained.

Chapter 4 deals with $\psi^*\alpha$ -irresolute maps and contra $\psi^*\alpha$ -irresolute maps. The association of these maps with other existing irresolute maps are analyzed.

$\psi^*\alpha$ -closed maps, $\psi^*\alpha$ -open maps, quasi $\psi^*\alpha$ -closed maps, quasi $\psi^*\alpha$ -open maps, $\psi^*\alpha$ -homeomorphisms and $\psi^*\alpha$ -quotient maps are introduced and their related properties are analyzed in chapter 5. Also the concepts $\psi^*\alpha$ -compact spaces and $\psi^*\alpha$ -connected spaces are determined and the standard results are derived.

In chapter 6, $(i, j)\text{-}\psi^*\alpha$ -closed sets and $(i, j)\text{-}\psi^*\alpha$ -open sets are defined in bitopological spaces. Properties and characterizations are analyzed. $(i, j)\text{-}\psi^*\alpha T_c$ -space, $(i, j)\text{-}\psi^*\alpha T_\alpha$ -space, $(i, j)\text{-}g_\alpha T_{\psi^*\alpha}$ -space and $(i, j)\text{-}\alpha_g T_{\psi^*\alpha}$ -space are defined and their interrelations among them are discussed.

In chapter 7, $(i, j)\text{-}\psi^*\alpha\text{-}\sigma_k$ -continuous maps, quasi $(i, j)\text{-}\psi^*\alpha$ -continuous maps, perfectly $(i, j)\text{-}\psi^*\alpha$ -continuous maps, totally $(i, j)\text{-}\psi^*\alpha\text{-}\sigma_k$ -continuous maps, strongly $(i, j)\text{-}\psi^*\alpha\text{-}\sigma_k$ -continuous maps, contra $(i, j)\text{-}\psi^*\alpha\text{-}\sigma_k$ -continuous maps, $(i, j)\text{-}\psi^*\alpha$ -irresolute maps and contra $(i, j)\text{-}\psi^*\alpha$ -irresolute maps are introduced in bitopological spaces and their properties and interrelations are analyzed.

$(i, j)\text{-}\psi^*\alpha$ -closed and open maps, quasi $(i, j)\text{-}\psi^*\alpha$ -closed and open maps and $(i, j)\text{-}\psi^*\alpha$ -homeomorphisms are defined and their properties and characterizations are discussed in the final chapter.

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