

## ON $\Psi_\delta$ -SETS AND $\Psi_\delta$ -FUNCTIONS DEFINED BY IDEALS

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**Abstract.** In this paper, we introduce two operator associate with  $\Psi$  and  $\delta$ -int operators in ideal topological spaces and investigate their properties. We will use the composite of these operators to offer a finer topology on  $X$  than  $\tau_\delta$  by utilizing the new notions of  $\Psi_\delta O(X)$ . Also, we will use a special ideal to define  $\omega_\delta$ -open and  $\omega_\delta$ -closed sets. Finally, we will give some of the fundamental properties of such sets and some existing functions in the literature.

### 1. Introduction

The study of local function on ideal topological space was introduced by Kuratowski [12]. Many mathematicians such as Jankovic and Hamlet [6, 7]; Samuel [20]; Hayashi [8]; Modak and Islam [11, 17, 15] have enriched this study. Natkaneic [18] have introduced the complement of local function and it is called  $\Psi$ -operator. In an ideal topological space  $(X, \tau, \mathcal{I})$ , the local function  $(\cdot)^*$  is defined as  $A^*(\mathcal{I}, \tau)$  (or simply  $A^*$ ) :=  $\{x \in X : (\forall U \in \mathcal{U}(x)) (U \cap A \notin \mathcal{I})\}$  where  $\mathcal{U}(x)$  is the collection of all open subsets containing  $x \in X$ . It is complement function, that is  $\Psi$ -operator is defined as  $\Psi(A) := X \setminus (X \setminus A)^*$ . Hdeib introduced the notion of  $\omega$ -closeness [9] by which he introduced and investigated the notion of  $\omega$ -continuity. Fomin introduced the notion of  $\theta$ -continuity [4] and the notion of  $\delta$ -continuity has been defined by Noiri [19]. The notions of  $\theta$ -open and  $\delta$ -open set have been introduced by Velicko [22]. He also showed that the collection of all  $\theta$ -open (resp.  $\delta$ -open) sets in a topological space forms a topology on  $X$  denoted by  $\tau_\theta$  (resp.  $\tau_\delta$ )

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