



## COMPACTNESS OF PRIME IDEAL SPACE

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### Abstract

In this Paper, We present the idea of Spectrum of  $R$ , Prime Ideal Space of  $R$ , denoted by  $\text{Spec}R$  and its properties. Suppose  $R$  is a regular ring. Define  $X_a = \{P \in X/a \notin P\}$ , where  $a \in R$ . Then  $\{X_a/a \in R\}$  is an open base for a topology on  $X$ . This topological space is called Prime ideal space of  $R$ . Also we prove

(i) There is one to one correspondence between the class of principal ideals of  $R$  and the Boolean algebra of idempotents of  $R$ ,  $B = B(R)$

(ii) There is one to one correspondence between the class of ideals of  $R$  and all ideals of Prime ideal Space,  $\text{Spec}R$  of  $R$ , Also we prove that the map between  $\text{Spec}R$  and  $\text{Spec}Z_R$  is continuous, where  $Z_R$  is the Boolean algebra of Prime ideals of  $R$ .

**Keywords and phrases:** regular rings, principal ideals, Boolean algebra, idempotents, prime ideals, maximal ideals, open base, topological space, clopen sets, totally disconnected space, Hausdorff space, compact space.