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Ideals in a Poset

Let $(P, \leq)$ be a Partially ordered set. Then an Ideal is any subset of P such that for any element x in I, it also has all the elements of P which are less than x.

Defintion:

$$I_x = \{y \in P | y \leq x\}$$

$$J(P) = \{I_x | x \in P\}$$

Lemma:

$$\forall (P, \leq), \forall \mathbb{X}_{\diamondsuit} \subseteq J(P)$$

$$\bigcup_{x \in \diamondsuit} \mathbb{X}_x \in J(P)$$