

(d) Suppose $X \times Y = A \cup B$. Let $X_A = \{p \in X : p \times Y \subset A\}$ and $X_B = \{p \in X : p \times Y \subset B\}$. Considering the sets in the Zariski topology, we see that

$$pY = (pY \cap A) \cup (pY \cap B)$$

and since each pY is irreducible as it is isomorphic to Y , each pY is contained in A or B . Hence $X = A \cup B$