

- $\Rightarrow \overline{P, X_{p_{jk}}}$  is a 2-plane in  $\langle X_{p_{ik}}, X_{p_{jk}} \rangle$ .  
 $\Rightarrow \overline{P, X_{p_{jk}}} \cap X_{p_{jk}} \ni q$   
 $\Rightarrow \overline{Pq}$  is a line in  $\overline{P, X_{p_{jk}}} \Rightarrow \overline{Pq} \cap X_{p_{ik}} \neq \emptyset$   
 $\Rightarrow L = \overline{Pq}$  is a line meeting  $X_{p_{ij}}, X_{p_{ik}}$  and  $X_{p_{jk}}$ .  $\square$

But since  $\Sigma \subset \mathbb{P}^5$  is cut out by quadrics, the line  $L$ , meeting  $\Sigma$  in three points, must lie in  $\Sigma$ ; since  $L$  meets lines of the form  $X_p$  on  $\Sigma$ , we must have  $L = X_h$  for some  $h \in R^*$ ; and since  $L$  meets  $X_{p_{ij}}, X_{p_{jk}}$  and  $X_{p_{ik}}$ , we must have  $h = \overline{p_{ij}, p_{jk}, p_{ik}}$ .

$\square \Sigma = F \cap G \cap H, F, G, H$  quadrics, by P169 ~ P170  
 $X_{p_{ij}}, X_{p_{jk}}, X_{p_{ik}} \subset \Sigma$  and  $L$  meets with those three disjoint lines  $\Rightarrow \#(L \cap \Sigma) \geq 3 \Rightarrow \#(L \cap F) \geq 3$   
 $\#(L \cap G) \geq 3$ , and  $\#(L \cap H) \geq 3$

$$\Rightarrow L \subset G \cap F \cap H = \Sigma$$

$\Rightarrow$  Since  $L$  meets lines of the form  $X_p$  on  $\Sigma$ , and  $L$  is of form  $X_p$  or  $X_h$ ,  $L = X_h$  ( $\because X_p$ 's are disjoint each other.)

$$\emptyset \neq X_h \cap X_{p_{ij}} = \sigma(h) \cap \sigma(p_{ij}) \cap F \Rightarrow p_{ij} \in h$$

$$\text{Similarly, } p_{jk}, p_{ik} \in h \Rightarrow h = \overline{p_{ij}, p_{jk}, p_{ik}}. \quad \square$$

Thus all four faces of the tetrahedron in  $\mathbb{P}^3$  with