$\phi(E_i) = \tau_i$, $\phi(G_j) = l_j$, where l_j is the unique line intersecting with five lines $\tau_1 \cdots \hat{\tau_j} \cdots \tau_6$ by the first observation.

$\phi(F_{ij}) = \eta_{ij}$ where η_{ij} is the unique line intersecting with τ_i & τ_j, $i \neq j$, by the second observation.

Let $\oplus$ be the intersection operation, i.e.

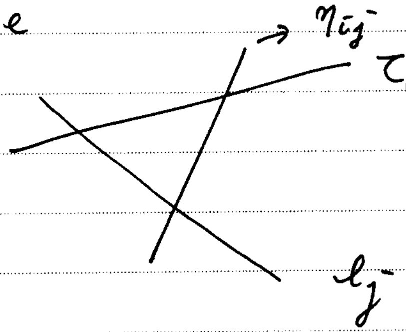
$E_i \oplus G_j = F_{ij}$ the unique line meeting with E_i & G_j, $i \neq j$.

What we have to show is that ϕ is homomorphism, i.e. $\phi(E_i \oplus F_{ij}) = \phi(E_i) \oplus \phi(F_{ij})$, etc.

(i) $\phi(E_i \oplus F_{ij}) = \phi(G_j) = l_j$

$\phi(E_i) \oplus \phi(F_{ij}) = \tau_i \oplus (\tau_i \oplus l_j) = \tau_i \oplus \eta_{ij} = l_j$

since



(ii) $\phi(G_i \oplus F_{ij}) = \phi(E_j) = \tau_j$ and $\phi(G_i) = l_i$. $\phi(F_{ij}) = \eta_{ij} \Rightarrow \tau_j = l_i \oplus \eta_{ij}$

(iii) $\phi(F_{12} \oplus F_{34}) = \phi(F_{56}) = \eta_{56} \Rightarrow \phi(F_{12}) \oplus \phi(F_{34}) = \eta_{12} \oplus \eta_{34} = \eta_{12} \oplus (\tau_3 \oplus l_4) = ? = \eta_{56}$. To show this, we need the third observation

3. η_{ij} does not meet with η_{ik}. $j \neq k$

η_{ij} " τ_k and l_k, $k \neq i, j$.