(b) $H_1 \neq H_2$

We may assume $H_1 = (X_0 = 0)$ & $H_2 = (X_1 = 0)$

$\Rightarrow$ $F \cap H_1 = G \cap H_1 \Rightarrow F(0, X_1, X_2, X_3) = G(0, X_1, X_2, X_3)$

$F \cap H_2 = G \cap H_2 \Rightarrow F(X_0, 0, X_2, X_3) = G(X_0, 0, X_2, X_3)$.

Express F & G as follows:

$$F = X_0(a_0 X_0 + a_2 X_2 + a_3 X_3) + X_1(b_1 X_1 + b_2 X_2 + b_3 X_3) + c X_0 X_1 + F'(X_2, X_3)$$

$$G = X_0(a_0' X_0 + a_2' X_2 + a_3' X_3) + X_1(b_1' X_1 + b_2' X_2 + b_3' X_3) + c' X_0 X_1 + G'(X_2, X_3)$$

$X_0 = 0$

$\Rightarrow$ $F(0, X_1, X_2, X_3) = k\,G(0, X_1, X_2, X_3)$.

$\Rightarrow$ Assume $k = 1$.

$\Rightarrow$ $(b_1, b_2, b_3, c) = (b_1', b_2', b_3', c')$ and $F' = G'$.

$\Rightarrow$ $F - G = X_0(a_0'' X_0 + a_2'' X_2 + a_3'' X_3)$.

$X_1 = 0 \Rightarrow 0 = X_0(a_0'' X_0 + a_2'' X_2 + a_3'' X_3)$

$\Rightarrow$ $a_0'' = a_2'' = a_3'' = 0$

$\Rightarrow$ $F = G$ $\Rightarrow$ Contradiction to the fact that F & G are generic elements.

Thus the only case (iv) $4 = 4$ remains.

$\Rightarrow$ $F \cap G$ is irreducible and is of degree 4. ///

$\Rightarrow$ Combining this with (2), we have $F \cap G$ which is of degree 4 and is of genus 1., i.e., $F \cap G$ is an elliptic curve of degree 4. ///

Let $F_\lambda = F + \lambda G$. If $\ell \subset F_\lambda$ for some λ,