1067-14-658 **Hongbo Li*** (`hli@mmrc.iss.ac.cn`), Key Laboratory of Mathematics Mechanization, Academy of Mathematics and Systems Science, Chinese Academy of Sciences, Beijing, Beijing 100190, Peoples Rep of China. *On the Number of Erdös' Consistent 5-tuples.*

Around 1994, Erdös et al. proposed the following challenging problem in enumerative projective incidence geometry, called consistent 5-tuple problem:

"For ten points a_{ij}, $1 \leq i < j \leq 5$, in the projective plane, if there are five points a_k, $1 \leq k \leq 5$, in which at least two points are different, such that a_i, a_j, a_{ij} are collinear for all $1 \leq i < j \leq 5$, we say the five points form a consistent 5-tuple. Now assume that no three of the a_{ij} are collinear. Is it true that there are only finitely many consistent 5-tuples?"

This talk is on the following theorems proved by us with Cayley expansion and Cayley factorization techniques:

Theorem 1. For 10 generic points $\{a_{ij} \,|\, 1 \leq i < j \leq 5\}$ in the plane, any consistent 5-tuple $\{a_k \,|\, 1 \leq k \leq 5\}$ satisfies:

(1) $a_i \neq a_j$ for $i \neq j$.

(2) $a_i \neq a_{ij}$ for $i \neq j$.

(3) $a_i \neq a_{jk}$ for $i \neq j \neq k$.

(4) a_i, a_{ij}, a_{ik} are noncollinear for $i \neq j \neq k$.

(5) a_i, a_{ij}, a_{jk} are noncollinear for $i \neq j \neq k$.

If any of the above conditions is violated, there are only finitely many consistent 5-tuples.

Theorem 2. For 10 generic points $\{a_{ij} \,|\, 1 \leq i < j \leq 5\}$ in the plane, there are at most 6 consistent 5-tuples. (Received September 13, 2010)