HOMEWORK SET #1 / CO2

Summer, 2015

June 15, 2015

1. The Fano plane has cyclic representation: shift the set $\{1, 2, 4\}$ (by adding 1 to its elements) six times, using arithmetic $\pmod 7$. Find similar representation for the finite plane of order 3 and order 4.

2. Show that if a Steiner triple system $S(2, 3, n)$ exists then $n \equiv 1$ or $n \equiv 3 \pmod 6$.

3. Work out the details of the proof of Theorem 1.4!

4. Prove or give counterexample for the following two statements. Regular linear spaces are uniform. Uniform linear spaces are regular.

5. Give a catalogue of linear spaces with six vertices. (Follow the convention of Figure 1.6.)

Extra Problems, due July 6$^{\text{th}}$

1. In a group of 70 students, for every choice of distinct students A, B, student A knows a language which student B does not know. At least how many languages do they know together?

2. Use the Fano plane for making a schedule for eight bridge players to play at two tables (four at each) on seven consecutive days so that any three players are together at the same table exactly once.