

21-301 Combinatorics
Homework 5
Due: Monday, October 27

1. Let $x_1, x_2, \dots, x_n$ be real numbers such that $x_i \geq 1$ for $i = 1, 2, \dots, n$. Let J be any open interval of width 2. Show that of the 2^n sums $\sum_{i=1}^n \varepsilon_i x_i$, ($\varepsilon_i = \pm 1$), at most $\binom{n}{\lfloor n/2 \rfloor}$ lie in J .
2. Suppose that we two-color the edges of K_6 Red and Blue. Show that there are at least two monochromatic triangles.
3. Show that $r(C_4, C_4) = 6$, where C_4 denotes a cycle of length 4.