1023-05-1602 **Daniel Felix*** (`dfelix@math.ucsd.edu`), 3883-B Miramar St., La Jolla, CA. *Density Relations in Simple Graphs.*

For simple graphs H and G, let $\delta(H;G)$ represent the density of H in G. That is, $\delta(H;G)$ is the number of induced subgraphs of G which are isomorphic to H, multiplied by the normalization factor $\binom{|V(G)|}{|V(H)|}^{-1}$. It is well known that certain canonical linear relations among these densities hold for all sufficiently large graphs. For example, the edge density of a graph can be expressed in terms of densities of graphs of order three:

$$\delta(K_2;G) = \frac{1}{3}\delta(K_2 \amalg K_1;G) + \frac{2}{3}\delta(P_2;G) + \delta(K_3;G).$$

We show that if a linear combination $\sum_i \alpha_i \delta(H_i;G)$ of densities always tends to zero as $|V(G)|$ tends to infinity, then this expression can be reduced to the zero expression by repeated applications of our canonical relations. We will discuss analogs of this theorem in different settings (such as uniform hypergraphs and subgraphs of the n-cube), as well as related questions.

A generalization of our result to partially labelled graphs shows that a particular partial pre-order $\leq_\sigma$ on the flag algebras A^σ introduced by A. Razborov is a partial order. (Received September 27, 2006)