1035-05-1033 **Robert A. Beeler*** (beelerr@etsu.edu), East Tennessee State University, Department of Mathematics, Box 70663, Johnson City, TN 37614-0663. *Linear Diophantine Equations in Graph Decompositions.*

A decomposition of a graph H by a graph G is a partition of the edges of H such that the subgraph induced by each part of the partition is isomorphic to G. Suppose that the vertex set of H is $V(H) = \{v_1, ..., v_n\}$ and the vertex set of G is given by $V(G) = \{u_1, ..., u_p\}$. A simple necessary condition for the existence of a G-decomposition of H is that for all $i = 1, ..., n$ there exists non-negative integers x_{ij} such that:

$$\sum_{j=1}^{p} x_{ij} deg(u_j) = deg(v_i).$$

As additional restrictions are placed on the decomposition, additional necessary conditions also become apparent. Often, these also take the form of Linear Diophantine Equations. In this talk, we will examine the importance of Linear Diophantine Equations to the study of Graph Decompositions. (Received September 18, 2007)