962-05-1380 **David J Grynkiewicz*** (dgrynkie@bates.edu), Bates College, Box 274, Lewiston, ME 04240.

On Zero-Sums and a Problem of Erdős, Preliminary report. Preliminary report.

We will present an equivalent formulation of the special case of Knesser's theorem on the densities of sequences. We then use this formulation to prove a theorem that for the purposes of zero-sum applications, shows in many cases that it is actually easier to find zero-sum solutions when the Cauchy-Davenport theorem does not apply (for general m). Finally we use this theorem to show that the four color Rado number for the following problem, first introduced by Erdős, zero-sum generalizes: For positive integers m and r, let $f(m, \mathbb{Z}_m^{(k)})$ be the minimum integer such that for every coloring of the integers $[1, f(m, \mathbb{Z}_m^{(k)})]$ by the elements of k disjoint labeled copies of $\mathbb{Z}_m$, $\mathbb{Z}_m^{(k)} = \mathbb{Z}_m^1 \cup \mathbb{Z}_m^2 \cup \ldots \cup \mathbb{Z}_m^k$, there exist two zero-sum subsets $B_1, B_2 \subseteq [1, f(m, \mathbb{Z}_m^{(k)})]$, which satisfy:$(i)$ $|B_1| = |B_2| = m$; (ii) the greatest integer in B_1 is less than the least integer in B_2; (iii) the diameter of the convex hull spanned by B_1 does not exceed the diameter of the convex hull spanned by B_2. We are able to determine that $f(m, \mathbb{Z}_m^2) = 12m - 9$. (Received October 03, 2000)