

AN APPLICATION OF KNESERS THEOREM

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ABSTRACT: Let A be a subset of $Z \times Z/dZ$, say $\cup_j s(a_j, B_j)$, where B_j is a subset of Z/dZ . A characterization of the set A under the condition that $|A + A|$ is at most $2.4|A|$, was given by Deshouillers and Freiman. They prove that if $s \geq 4$, there exists a subgroup H and elements x and y in Z/dZ , such that B_j is contained in the coset $a_jx + y$ of H . We show that the characterization still holds if $|A + A|$ is at most $2.5|A|$ and discuss why this is likely to be the best possible.