

Additive Combinatorics  
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## A new inverse theorem in $Z_p$

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### **Abstract**

The Hamidoune–Rodseth Theorem says that if  $A$  and  $B$  are two subsets of  $Z_p$  satisfying certain size restrictions, and  $|A+B| \leq |A|+|B|$ , then  $A$  and  $B$  are both subsets of arithmetic progressions with the same common difference and with lengths at most  $|A|+1$  and  $|B|+1$  respectively. We discuss the natural generalisation of this theorem to more than two summands, and an application of this latter result in Rainbow Ramsey Theory.