A "Cubic" Excursion in Additive Number Theory

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Abstract

The "Easier" Waring problem is to find the minimum positive integer s so that each positive integer n can be written as the sum or differnce of s kth powers; that is, so for each n,

$$\pm x_1^k \pm x_2^k \pm x_3^k \pm \cdots \pm x_s^k = n$$

has a solution in $\mathbb{N}_0$. I will I will discuss the cubic case ($k = 3$) of the "Easier" Waring problem as well as some related diophantine problems involving equal sums of cubes.