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*"Constellations in  $P^d$ "*

Abstract: A constellation is a higher dimensional analogue of an arithmetic progression, namely something of the shape  $\{\mathbf{x}, \mathbf{x} + t\mathbf{e}_1, \dots, \mathbf{x} + t\mathbf{e}_d\} \in \mathbb{Z}^d$ , where  $t \in \mathbb{Z}$  and  $\mathbf{x}, \mathbf{e}_1, \dots, \mathbf{e}_d \in \mathbb{Z}^d$ . We discuss finding such patterns lying inside a relatively dense subsets of  $P^d$ , where  $P$  denotes the set of primes. While the case for general sets of  $\{\mathbf{e}_j\}$  remains open, if the  $i^{\text{th}}$  coordinate of the  $\mathbf{e}_j$  is distinct in  $j$  for each  $i$ , the existence of infinitely many constellations of this shape is shown. This is joint work with Ákos Magyar.