

On Szemerédi's theorem in sparse sets of primes

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About two decades ago, Green introduced the transference principle, which provides a powerful framework for studying additive patterns in sparse arithmetic sets. Although recent breakthroughs by Bloom–Sisask and Kelley–Meka establish the presence of 3-APs in the primes without relying on transference, the principle remains a valuable tool for exploring general additive patterns in sparse sets. Moreover, it has also found applications in sieve methods and multiplicative problems. In this talk, I will take "finding k -APs in primes" as an example to introduce several approaches to carrying out the transference argument. This includes ongoing joint work with Joni Teräväinen.