Abstract

The first problem we are dealing with in Chapter 2 is a quaternary problem that can be seen as a generalization of Languasco & Zaccagnini [2], Liu & Sun [4] and Wang & Yao [5].

The second quaternary problem outlined in Chapter 3 has a lower density and it leads to a narrower range for k.

The last problem outlined in Chapter 4 of this dissertation deals with an improvement of the result contained in Languasco & Zaccagnini [3]. Such improvements are contained in [1], due to Languasco, Zaccagnini and the author of this dissertation.

All these problems were treated by combining Harman's technique on the minor arc with a suitable estimate for the L^4-norm of the relevant exponential sum over primes.

References

[1] A. Gambini, A. Languasco, and A. Zaccagnini. A Diophantine approximation problem with two primes and one k-th power of a prime. *arXiv preprint arXiv:1706.00343*, 2017. Submitted.

[2] A. Languasco and A. Zaccagnini. A Diophantine problem with a prime and three squares of primes. *Journal of Number Theory*, 132(12):3016–3028, 2012.

[3] A. Languasco and A. Zaccagnini. A Diophantine problem with prime variables. *in V. Kumar Murty, D. S. Ramana, and R. Thangadurai, editors, Highly Composite: Papers in Number Theory, Proceedings of the International Meeting on Number Theory, celebrating the 60th Birthday of Professor R. Balasubramanian (Allahabad, 2011). Ramanujan Mathematical Society–Lecture Notes Series*, 23:157—168, 2016.

[4] Z. Liu and H. Sun. Diophantine approximation with one prime and three squares of primes. *The Ramanujan Journal*, 30(3):327–340, 2013.

[5] Y. Wang and W. Yao. Diophantine approximation with one prime and three squares of primes. *Journal of Number Theory*, 2017.