

**Abstract of paper [1].**

We give several asymptotic formulae for the average number of representations of an integer as a sum of a prime and a square. We adapt Hardy & Littlewood's original approach to additive problems with infinite series, since this method is more precise when dealing with short intervals.

**References**

- [1] A. Languasco and A. Zaccagnini. Short intervals asymptotic formulae for binary problems with primes and powers, I: Density  $3/2$ . *Ramanujan J.*, 42(2):371–383, 2017.