Exposé court

37   *Multiplicative functions in short intervals*

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In this talk, I will present recent joint work with Pranendu Darbar. We will discuss a general class of multiplicative functions by relating "short averages" to its "long average". More precisely, we estimate the variance of such a class of functions asymptotically in short intervals using Fourier analysis and counting rational points on certain binary forms. Our result is applicable to the interesting multiplicative functions

$$\mu_k(n), \frac{\phi(n)}{n}, \frac{n}{\phi(n)}, \mu^2(n)\frac{\phi(n)}{n}, \sigma_\alpha(n), (-1)^{\#\{p\,:\,p^k|n\}}$$

and many others that establish various new results and improvements in short intervals to the literature.