

Almost everywhere averaging on rectangles

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If (B_k) is a sequence of measurable subsets (with positive Lebesgue measure) of the Euclidean space containing (or “close” to) the origin and whose diameters tend to zero, one can associate to it an approximate identity $(\chi_{B_k}/|B_k|)_{k \in \mathbb{N}}$ and the corresponding averages:

$$A_k f(x) := \frac{\chi_{B_k}}{|B_k|} * f(x).$$

While the L^p convergence of the sequence $(T_k f)$ to f for $f \in L^p(\mathbb{R}^n)$ is usually an obvious fact, the issue of its almost everywhere convergence is often delicate (it holds *e.g.* if (B_k) is a sequence of cubes, while it may not hold if (B_k) is a sequence of parallelepipeds without control on its “flatness”). This talk will review some recent works about those averaging processes when (B_k) is a sequence of rectangles — and about the corresponding Lebesgue’s differentiation theorems in the context of differentiation bases of rectangles.

References

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