

Funded by the projects UIDB/00297/2020 and UIDP/00297/2020

Seminar of Analysis

Speaker: Alina Shalukhina (Department of Mathematics, NOVA FCT, Portugal).

Date/Time: 12/03/2025 (Wednesday), 14:15 – 15:15.

Location: Room 1.16, Building VII.

Title: On interpolation of variable Lebesgue spaces over spaces of homogeneous type

Abstract: We show that the Hardy–Littlewood maximal operator M is bounded on a variable Lebesgue space $L^{p(\cdot)}(X)$, $1 < p_- \leq p_+ < \infty$, over a space of homogeneous type X if and only if, for every $q \in (1, \infty)$, the exponent $p(\cdot)$ can be represented as

$$\frac{1}{p(x)} = \frac{\theta}{q} + \frac{1-\theta}{r(x)}, \quad x \in X,$$

so that M is bounded on $L^{r(\cdot)}(X)$ for all sufficiently small $\theta > 0$. This is an extension of the analogous result by Diening, Karlovykh and Shargorodsky from the Euclidean spaces to spaces of homogeneous type. Results of this kind are applied for transferring properties like compactness of linear operators from standard Lebesgue spaces to the variable ones.