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### “Convex integrals of molecules in Lipschitz-free spaces”

This talk will focus on the problem of finding “nice” representations of elements of Lipschitz-free spaces. To this end, we will apply some results from the optimal transport theory.

We call an element  $m \in \mathcal{F}(M)$  a *convex integral of molecules* if there exists a positive Radon measure  $\mu$  on  $\widetilde{M} = \{(x, y) \in M \times M : x \neq y\}$  such that  $\|m\| = \|\mu\|$  and that for every  $f \in \text{Lip}_0(M)$ , we have

$$\langle m, f \rangle = \int_{\widetilde{M}} \frac{f(x) - f(y)}{d(x, y)} d\mu(x, y).$$

In general, not all elements of Lipschitz-free spaces are convex integrals of molecules. We will present a sufficient condition in the form of the existence of a decomposition into majorisable functionals that admits a local application of the Kantorovich duality. We will then discuss some examples and open questions.

Finally, we will introduce a broader framework for this study through the de Leeuw’s transformation. This allows the analysis to be extended to all functionals on Lipschitz spaces.

This is a joint work with Ramón J. Aliaga (Universitat Politècnica de València) and Richard J. Smith (University College Dublin), and you will have the opportunity to see a continuation of the presented work in Richard’s talk and some of its applications in Ramón’s.

