IF I WERE A RICH DENSITY

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Abstract upper densities are monotone and subadditive functions from the power set of positive integers into the unit real interval that generalize the upper densities used in number theory, including the upper asymptotic density, the upper Banach density, and the upper logarithmic density.

At the open problem session of the Workshop "Densities and their application", held at St. Étienne in July 2013, G. Grekos asked a question whether there is a "nice" abstract upper density, whose the family of null sets is precisely a given ideal of subsets of $\mathbb{N}$, where "nice" would mean the properties of the familiar densities consider in number theory.

In 2018, M. Di Nasso and R. Jin (Acta Arith. 185 (2018), no. 4) showed that the answer is positive for the summable ideals (for instance, the family of finite sets and the family of sequences whose series of reciprocals converge) when "nice" density means translation invariant and rich density (i.e. density which is *onto* the unit interval).

In my talk I show how to extend their result to all ideals with the Baire property. This extension was obtained jointly with Jacek Tryba.

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