Defining limits in $(\infty, 2)$-categories

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An $(\infty, 1)$-category has been shown to support most theorems and constructions of category theory and, in particular, limits in an $(\infty, 1)$-category have been constructed as terminal objects in the corresponding $(\infty, 1)$-category of cones. In this talk, I will present a generalization of this construction to the $(\infty, 2)$-categorical setting.

A good notion of limit in a (strict) 2-category is that of a 2-limit, which is defined as a categorically enriched limit. Unlike its 1-categorical analogue, a 2-limit cannot be characterized as a 2-terminal object in the corresponding 2-category of cones. Instead, a passage to double categories allows such a characterization and a 2-limit is equivalently a double terminal object in the corresponding double category of cones. This issue extends to the ∞-setting and we define limits in an $(\infty, 2)$-category as terminal objects in a double $(\infty, 1)$-category of cones. In particular, we show that this definition is equivalent to the established definition of $(\infty, 2)$-limits as $(\infty, 1)$-categorically enriched limits across change of models. This is work in progress with Nima Rasekh and Martina Rovelli.