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Residually finite equational theories

An equational theory T is said to be *residually finite* if every model of T can be embedded in a product of finite models of T . Equivalently, T is residually finite if and only if its irreducible models (those that cannot be embedded in products of “simpler” models) are all finite. If one looks “in nature” for equational theories which are residually finite AND have a finite signature, one invariably finds that, except in “extreme” cases, the theory has a stronger property: there is a finite upper bound to the sizes of its irreducible members. In this lecture I will describe some conjectures about this phenomenon and some recent progress on one of them. This is joint work with Keith Kearnes and Agnes Szendrei.