

# Finitely forcible graph limits are universal

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The theory of graph limits represents large graphs by an analytic object called a graphon. Graph limits determined by finitely many graph densities, which are represented by finitely forcible graphons, arise in various scenarios, particularly within extremal combinatorics. Lovász and Szegedy conjectured that all such graphons possess a simple structure, e.g., their space of typical vertices is always finite dimensional; this was disproved by several ad hoc constructions of complex finitely forcible graphons. We prove that any graphon is a subgraphon of a finitely forcible graphon, which completely dismisses any hope for a result showing that finitely forcible graphons possess a simple structure. Moreover, since any finitely forcible graphon represents the unique minimizer of some linear combination of densities of subgraphs, our result also shows that such minimization problems may in fact have unique optimal solutions with arbitrarily complex structure.