

1106-60-2013 **Xiang Li*** (lisha@math.berkeley.edu), 367 Evans Hall, UC Berkeley, Berkeley, CA 94620, and
Balázs Szegedy, MTA Alfréd Rényi Institute of Mathematics. *A case for graph limits: The Logarithmic Calculus and Application to Sidorenko's Conjecture.*

We use the graph limit setting to tackle the Erdos-Simonovits-Sidorenko's Conjecture. The conjecture posits an inequality for subgraph densities, which roughly says that among all graphs, the Erdos-Renyi random graph minimizes the subgraph count of any bipartite graph. The inequality is a refinement of the Forcing conjecture in extremal combinatorics, and relates to quasi-randomness. The graph limit setting allows us to develop a unified perspective to prove the result for previous cases and greatly expands the family of graphs for which the conjecture is true. We are able to develop an algebra of graph operations that preserves Sidorenko's property, which we dub the 'Logarithmic Calculus'. The approach opens topological interpretations and proposes open problems to help solve Sidorenko's Conjecture. (Received September 15, 2014)