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Eldar Fischer* (eldar@cs.technion.ac.il), Faculty of CS, Technion - Israel Institute of Technology, 3200003 Haifa, Israel. *The robustness framework for strong regularity lemmas and the application for ordered graphs.*

Since (at least) 1999, works in Combinatorics and CS used lemmas that strengthen the original Regularity Lemma of Szemerédi, and extensions of regularity-like concepts to objects other than graphs.

Two general mechanisms have emerged. One of them is the well-known Analytic Regularity Lemma framework, which substitutes arguments about graphs (or other discrete objects) with analytic arguments about the “limit” objects.

Here I’ll discuss the other general mechanism, that of partition robustness. For graphs, a vertex partition to k parts is robust with respect to a function f , if it cannot be repartitioned into $f(k)$ parts in a way that significantly raises its index measure.

The robustness mechanism is applicable also to settings where it is hard to define a limit object. On the other hand, it requires explicitly specifying an appropriate f , whereas the analytic framework is “function-free”.

Much of the talk will showcase the application of this framework to a recent result from a joint work with Noga Alon and Omri Ben-Eliezer, providing a removal lemma for all hereditary properties of vertex-ordered graphs. Despite these objects admitting no notion of isomorphism, the notion of containment is “graph-like” enough to allow for a regularity-like scheme. (Received September 22, 2018)