1077-05-1941 **Ashwini Aroskar*** (aaroskar@andrew.cmu.edu) and **James Cummings**. *Limits, Regularity and Removal for Relational Structures : A measure theoretic approach.*

Szemeredi's Regularity Lemma states a large graph can be well-approximated by graphs that are almost random[1]. A well-known application of this result is in the proof of the Graph Removal lemma[2]. Our work builds on known results for k-uniform hypergraphs including the existence of limits, a Regularity Lemma and a Removal lemma[3,4]. Our main tool is the theory of measures on ultraproduct spaces which shows a correspondence between these spaces and the Euclidean space. We have extended this correspondence to measurable functions on these spaces. We show the existence of a limit object for sequences of relational structures and retrieve known limits for graphs and digraphs. We also state and prove Regularity, Removal and Generalized Removal Lemmas for relational structures. Generalized Removal deals with the removal of a family of structures and has applications in property testing. We also explore extensions of these results to weighted structures such as weighted graphs. 1)Szemerédi, E.Proc.Colloq.Int. CNRS(1976), 399-401 2)Erdös, P. et al. Graphs and Combinatorics(1986), 2(1), 113-121 3)Elek, G. & Szegedy, B. preprint, arXiv.org:0705.2179 4)Elek, G. & Szegedy, B. preprint, arXiv.org:0810.4062 (Received September 21, 2011)