

November 2010

Coma & MADALGO seminar by Elad Verbin, Aarhus University

An exposition of Barak et al's direct sum theorem

**Abstract:**

In 2009, Barak, Braverman, Chen and Rao proved a first-of-its-kind direct sum result for randomized communication complexity. They prove that if  $f$  requires  $C$  bits of communication, then  $f^n$  requires at least  $\sqrt{n} * C$  bits of communication. (I'm ignoring some error terms, polylog terms, etc.). More details, full definition of the setting, etc., can be found in their ECCC paper here: <http://eccc.uni-trier.de/report/2009/044>

Their result relies on some standard tools from the area, along with two new tools: a new method for "message compression" which is more efficient in some sense than all previous methods, and a new definition of "information content" which suits their purposes. In this talk I will give a short exposition of their result, and outline some open research directions. I assume no prior knowledge of information theory.