1011-68-98 **Lance Fortnow*** (`fortnow@cs.uchicago.edu`), Department of Computer Science, University of Chicago, 1100 E. 58th St., Chicago, IL 60637. *Connections Between Kolmogorov and Computational Complexity.* Preliminary report.

We describe a couple of results showing some close connections between Kolmogorov complexity and Computational Complexity.

- (With Luis Antunes) Levin considers the distribution $m(x) = 2^{-K(x)}$ and shows that for some constant c,

  $$m(x) \geq c \sum_{y:U(y)=x} 2^{-|y|}$$

  and $m(x)$ is universal among the semicomputable semimeasures.

  We consider $m^p(x) = 2^{-K^p(x)}$ for polynomial p. We show that under reasonable derandomization assumptions there for all polynomials q there is a polynomial p such that for all x,

  $$m^p(x) \geq \frac{1}{p(|x|)} \sum_{p:U(y)=x \text{ in } q(|x|) \text{ steps}} 2^{-|y|}$$

  and in some sense m^p is universal among the polynomial-time sampleable distributions.

- We give Kolmogorov interpretations of recent results on extractors. For example, based on Raz's recent work we show that for any $\delta > 0$ there is a constant c and a polynomial-time computable function f such that for all strings x and y if

  - $K(x) \geq (1/2 + \delta)|x|$,

- $K(y) \geq 2c \log |x|$, and
- $K(xy) \geq K(x) + K(y) - c \log |x|$

then $|f(x, y)| = c|x|$ and $K(f(x, y)) \geq |f(x, y)| - c \log |x|$.

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