POLYNOMIAL HIERARCHY COLLAPSES

Thousands Feared Tractable

by Scott Aaronson

PSPACE, April 12, 7PM EST—The polynomial hierarchy collapsed to the second level at 4:20PM this afternoon, prompting a frantic search for surviving hard problems. Over five hundred languages have been confirmed Σ_2^P-decidable, and rescue workers fear the count may reach as high as $\aleph_0$.

Despite ongoing investigation, the cause of the collapse remains unknown. Though many blamed sabotage by disgruntled computer-science majors, undergraduates insisted they lack the know-how to carry out such an attack. Some, including Dr. Gregory Chaitin of IBM's T.J. Watson Research Center, believe the collapse was an accident, with no explanation outside of itself. But citing Gödel's theorem, Chaitin cautioned that even an inconsistency in the Zermelo-Fraenkel axioms cannot be ruled out.

At an emergency press conference, President Stephen Cook declared that "today, we mourn the collapse of a hierarchy that symbolized our deepest hopes and conjectures. Yet let us renew our determination to separate P from NP from coNP, so that those classes at least remain secure for our grandchildren." Responding to reporters' questions, Cook dismissed allegations that a further collapse from $\Sigma_2^P \cap \Pi_2^P$ to P^{NP} was imminent.

Complexity theorists say they had warned of collapse for decades, but were tragically ignored. "Polynomial-size circuits for NP, coNP in AM, a reduction from SAT to graph isomorphism—all of these dangers were well known," said Dr. Lance Fortnow of NEC Research Institute. "Yet somehow, we failed to communicate their seriousness to the computer scientist on the street." Dr. Albert Meyer, an MIT engineering professor and one of the architects of the hierarchy, expressed shock on learning of the collapse. "PH was built to take a lot of abuse, at least relative to an oracle," he said. "P = BQP, satisfying assignments constructible via nonadaptive NP queries, you name it. I'm afraid we're up against a new, nonrelativizing menace."

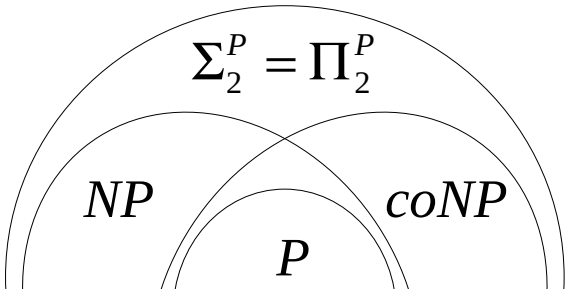

PHOTO: The scene of the devastation.

The recursively enumerable languages were nearly unanimous in support of the victims, with all but finitely many expressing condolences. As far away as NEXP, languages could be seen lining up to donate 'yes' instances to aid relief efforts. A and B, the incomparable r.e. sets best known for their resolution of Post's Problem, even pledged medical assistance for treating finite injuries, calling it their top priority.

Among the few to celebrate the collapse were activists at the University of California, Berkeley. "As its very name suggests, this hierarchy was a citadel of polynomiocentrism and repression," said a flyer handed out by the group SEACC, or Students for Equality Among Complexity Classes. "No longer can the Σ_k^P's continue their subjugation and 'othering' of the Π_k^P's for k greater than or equal to 2."