1007-03-15 **John Case*** (`case@cis.udel.edu`), CIS Department, University of Delaware, 103 Smith Hall, Newark, DE 19716, and **Keh-Jian Chen**, **Sanjay Jain**, **Wolfgang Merkle** and **James Royer**. More General Machine Learners Yield More Complex or Information-Poor Learned Programs.

Investigated are some surprising and delicate tradeoffs between the generality of an algorithmic learning device and the quality of the correct programs it converges to. There are results to the effect that, with small increases in generality of the learning device, the computational complexity of some successfully learned programs is provably unalterably suboptimal. Importantly, there are also results in which the complexity of successfully learned programs is optimal and the learning device is quite general, but some of those optimal, learned programs are provably unalterably information deficient – in fact, deficient as to safe extractability of the fact that they are optimal. For these results, the safe methods of information extraction will be by proofs in arbitrary, recursively axiomatizable, true extensions of Peano Arithmetic. (Received November 20, 2004)