

1007-68-141

Kevin T. Kelly* (kk3n@andrew.cmu.edu), Carnegie Mellon University, 135 K Baker Hall,
Pittsburgh, PA 15213. *Ockham, Complexity, and Truth.*

Perhaps the most vexing problem concerning scientific method is to explain the nature of empirical complexity and the sense in which a bias toward simplicity helps one find the true theory. Algorithmic information theorists claim to define empirical simplicity but have not yet explained how a simplicity bias facilitates the search for truth better than other possible biases.

I propose an alternative concept of simplicity, based on topological invariants of scientific problems, that does explain how simplicity helps one find the truth. The basic idea, inspired by concepts from computational learning theory, is that simplicity does not necessarily point toward the truth (nothing could, by the "no free lunch" theorems) but, rather, *minimizes retractions or reversals of opinion prior to convergence to the right answer*. This idea explains how and when the standard complexity-theoretic definitions of Ockham's razor "work" and is much more analogous to computational complexity theory, in the sense that the underlying complexity concept is grounded in the intrinsic difficulty of finding the true answer to the problem at hand. (Received February 17, 2005)