

Physical Uncomputability and the Nature of Information-Processing

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The Physical Computability Thesis (PCT) states that the physical world is computable. Sometimes it is argued that a well-evidenced logical principle, the Church-Turing Thesis, entails PCT. But this reasoning is faulty. I argue that it is an open question whether PCT is true: even if the universe is finite, physics may turn out to confound PCT. What would a non-computable physics look like, and what would be the implications for scientists and engineers? I review potential countermodels to various formulations of PCT.