Universe creation on a computer

McCabe, Gordon (2004) Universe creation on a computer.

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Abstract

The purpose of this paper is to provide an account of the epistemology and metaphysics of universe creation on a computer. The paper begins with F.J.Tipler's argument that our experience is indistinguishable from the experience of someone embedded in a perfect computer simulation of our own universe, hence we cannot know whether or not we are part of such a computer program ourselves. Tipler's argument is treated as a special case of epistemological scepticism, in a similar vein to `brain-in-a-vat' arguments. It is argued that the hypothesis that our universe is a program running on a digital computer in another universe generates empirical predictions, and is therefore a falsifiable hypothesis. The computer program hypothesis is also treated as a hypothesis about what exists beyond the physical world, and is compared with Kant's metaphysics of noumena. It is proposed that a theory about what exists beyond the physical world should be formulated with the precise concepts of mathematics, and should generate physical predictions. It is argued that if our universe is a program running on a digital computer, then our universe must have compact spatial topology, and the possibilities of observationally testing this prediction are considered. The possibility of testing the computer program hypothesis with the value of the density parameter Omega_0 is also analysed. The informational requirements for a computer to represent a universeexactly and completely are considered. Consequent doubt is thrown upon Tipler's claim that if a hierarchy of computer universes exists, we would not be able to know which `level of implementation' our universe exists at. It is then argued that a digital computer simulation of a universe cannot exist as a universe. However, the paper concludes with the acknowledgement that an analog computer simulation can be objectively related to the thing it represents, hence an analog computer simulation of a universe could, in principle, exist as a universe.

Keywords:	Computer Cosmology Creation Scepticism Information Entropy
Subjects:	Specific Sciences: Physics: Cosmology Specific Sciences: Mathematics Specific Sciences: Computer Science Specific Sciences: Physics: Relativity Theory Specific Sciences: Physics
ID Code:	1891
Deposited By:	McCabe, Gordon
Deposited On:	18 August 2004