

Contents

Introductory note	1
On the difficulty of computations <i>IEEE Transactions on Information Theory</i> , 1970	3
Information-theoretic computational complexity <i>IEEE Transactions on Information Theory</i> , 1974	17
Randomness and mathematical proof <i>Scientific American</i> , 1975	31
Gödel's theorem and information <i>International Journal of Theoretical Physics</i> , 1982	47
Randomness in arithmetic <i>Scientific American</i> , 1988	65
Randomness in arithmetic and the decline & fall of reductionism in pure mathematics <i>Bulletin of the European Association for Theoretical Computer Science</i> , 1993	75
A century of controversy over the foundations of mathematics Calude & Paun, <i>Finite versus Infinite</i> , 2000	99
A century of controversy over the foundations of mathematics <i>Complexity</i> , 2000	129
Metamathematics and the foundations of mathematics <i>Bulletin of the European Association for Theoretical Computer Science</i> , 2002	153

Paradoxes of randomness	
<i>Complexity</i> , 2002	169
Two philosophical applications of algorithmic information theory	
<i>Lecture Notes in Computer Science</i> , 2003	189
On the intelligibility of the universe and the notions of simplicity, complexity and irreducibility	
Hogrebe & Bromand, <i>Grenzen und Grenzüberschreitungen</i> , 2004	201
Leibniz, information, math & physics	
Löffler & Weingartner, <i>Wissen und Glauben</i> , 2004	227
Leibniz, randomness & the halting probability	
<i>Mathematics Today</i> , 2004	241
Complexity & Leibniz	
<i>Académie Internationale de Philosophie des Sciences</i> , Tenerife, 2005	247
The limits of reason	
<i>Scientific American</i> , 2006	251
How real are real numbers?	
<i>International Journal of Bifurcation and Chaos</i> , 2006	267
Epistemology as information theory: From Leibniz to Ω	
<i>Collapse: Journal of Philosophical Research and Development</i> , 2006	281
Is incompleteness a serious problem?	
Lolli & Pagallo, <i>La complessità di Gödel</i> , 2007	299
Speculations on biology, information & complexity	
<i>Bulletin of the European Association for Theoretical Computer Science</i> , 2007	303
How much information can there be in a real number?	
<i>International Journal of Bifurcation and Chaos</i> , 2007	313
The halting probability Ω: Irreducible complexity in pure mathematics	
<i>Milan Journal of Mathematics</i> , 2007	319

The halting probability Ω: Concentrated creativity	
Obrist, <i>Formulas for the Twenty-First Century</i> , 2007	333
List of publications	335
Acknowledgements	343
About the author	347