
This document contains a guide to a representative sample of recent research of Dr Olivier Bournez. His body of published research over the last ten years is considerable (I myself am aware of around thirty publications in internationally regarded journals and in proceedings of leading conference series), and the work described here represents a small part of this. Much of this research is highly original, dealing with intractable and fundamental questions concerning the nature and applications of physical computation and its models. I am, in fact, very familiar with the work of Dr Bournez, who is an active participant in the network and conference series "Computability in Europe", of which I am currently overall coordinator. And I have found Dr Bournez to be not just an innovative and internationally respected researcher, but also an able and energetic organiser, lecturer, and contributor to research and training activities on a broad front.

The Habilitation document nicely points to some of the more significant recent work in which Dr Bournez has been a prime mover.

Chapters 1 and 2 set out the motivational basis for his research, pointing to the importance and current relevance of research into the computational characteristics of a range of dynamical systems coming from physics, biology, bioinformatics, computer virology, game theory and distributed algorithms. These two chapters succinctly capture the excitement of this research, and illustrate its breadth of background and underlying interdisciplinarity. Chapter 2 focuses on particular issues related to concurrency, interactivity, and continuous models, which emerge from real-world computational considerations.

Chapter 3 is a recent survey of the area of continuous time computations. This substantial and comprehensive overview, particularly relevant to the recent resurgence of interest in analogue computation, is expected to appear in 2007 in the Springer volume "New Computational Paradigms" (Springer-Verlag).

Chapter 4 takes a more detailed look at some particular continuous time models. The results on R-recursive functions are of particular interest, opening the way to a very natural algebraic characterisation of the computable functions of analysis.
Chapter 5 places a number of results within the influential Blum-Shub-Smale model of real computation, characterising almost all of the complexity classes highlighted in the 1998 book of Blum, Cucker, Shub and Smale.

Of course, this is all high quality and internationally leading research which is being described, which makes a clear recommendation from me for progress towards Dr Bournez' Habilitation very much a formality. However, I would like to add that this is a prime example of adventure in research, relating to a broad spectrum of scientific issues, and this makes my recommendation a specially enthusiastic one.

Yours sincerely,

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