A MINIMAL RK-DEGREE

Alexander Raichev and Frank Stephan

A. Raichev: Department of Mathematics, University of Wisconsin – Madison
480 Lincoln Drive, Madison, WI 53706, United States of America
Email: raichev@math.wisc.edu
F. Stephan: School of Computing and Department of Mathematics
National University of Singapore, 3 Science Drive 2, Singapore 117543
Email: fstephan@comp.nus.edu.sg

We construct a minimal rK-degree, continuum many, in fact. We also show that every minimal sequence, that is, a sequence with minimal rK-degree, must have very low descriptional complexity, that every minimal sequence is rK-reducible to a random sequence and that there is a random sequence with no minimal sequence rK-reducible to it.

Contents

1. Introduction

This article continues the study of relative randomness via rK-reducibility initiated in [3] and pursued in [9].

One of the most popular definitions of absolute algorithmic randomness states that an infinite binary sequence R is random if it is incompressible, that is, if

$$\exists d \forall n \,.\, K(R[n]) \geq n - d,$$

where $K(\sigma)$ is the prefix-free descriptional complexity of the string σ. Under this same paradigm of incompressibility, one can define relative algorithmic