Theoretical Computer Science 770 (2019) 101

Contents lists available at ScienceDirect

Theoretical Computer Science

www.elsevier.com/locate/tcs

Corrigendum to "On the rate of decrease in logical depth" [Theor. Comput. Sci. 702 (2017) 60–64] by L.F. Antunes, A. Souto, and P.M.B. Vitányi

P.M.B. Vitányi [1]

CWI and University of Amsterdam, the Netherlands

ARTICLE INFO

Article history:
Received 11 July 2018
Accepted 13 July 2018
Available online 7 August 2018
Communicated by P. Spirakis

In section 4 of the paper mentioned in the title it is assumed that, for all $x \in \{0,1\}^*$, the string x^* is the only incompressible string such that $U(x^*) = x$. However, this assumption is wrong in that for many x there may be an incompressible string p with $|x| \geq |p| > |x^*|$ such that $U(p) = x$. Moreover, the computation of $U(p) = x$ may be faster than that of $U(x^*) = x$. For example, the function from $x \in \{0,1\}^*$ to the least number of steps in a computation $U(p) = x$ for an incompressible string p may be computable. The argument in the paper is correct if we use

Definition 1. Let x be a string and b a nonnegative integer. The logical depth, version 2, of x at significance level b, is

$$\text{depth}_b^{(2)}(x) = \min \left\{ d : p \in \{0,1\}^* \wedge U^d(p) = x \wedge |p| \leq K(x) + b \right\},$$

the least number of steps to compute x by a program which is b-incompressible with respect to x^*.

As a further correction: In the first line of the proof of Theorem 2 the string x_n is more properly denoted by x; the remaining changes are self-evident.

Acknowledgement

The problem addressed here was raised by Marlou Gijzen.

DOI of original article: https://doi.org/10.1016/j.tcs.2017.08.012.

E-mail address: Paul.Vitanyi@cwi.nl.

[1] CWI, Science Park 123, 1098XG Amsterdam, the Netherlands. (CWI is the National Research Institute for Mathematics and Computer Science in the Netherlands.)

https://doi.org/10.1016/j.tcs.2018.07.009