

Extending the Limit Theorem of Barmpalias and Lewis-Pye to all reals

Ivan Titov

Abstract

By a celebrated result of Kučera and Slaman [SIAM JC 31(1):199-211, 2001], the Martin-Löf random left-c.e. reals form the highest left-c.e. Solovay degree. Barmpalias and Lewis-Pye [JCSS 89:349–360, 2016] strengthened this result by showing that, for all left-c.e. reals α and β such that β is Martin-Löf random and all left-c.e. approximations a_0, a_1, \dots and b_0, b_1, \dots of α and β , respectively, the limit

$$\lim_{n \rightarrow \infty} \frac{\alpha - a_n}{\beta - b_n}$$

exists and does not depend on the choice of the left-c.e. approximations to α and β .

Here we give an equivalent formulation of the result of Barmpalias and Lewis-Pye in terms of nondecreasing translation functions and generalize their result to the set of all (i.e., not necessarily left-c.e.) reals.