

Abstract

Recently, a new type of random number generator (RNG) was proposed to improve the performance of some well-known RNGs. Using random integers from other RNGs as input, this new type of RNG outputs the ratios of consecutive non-overlapping pairs of those random integers. This thesis extends the definition of this new RNG and investigates both its theoretical and empirical properties. In the theoretical analysis part, it is proved that the new type of RNG can produce much more different random reals in $[0, 1]$ than the traditional approach, which produces random reals in $[0, 1]$ through dividing the random integers from a source RNG by the largest integer that the source RNG can generate. In the empirical study part, 18 well-known RNGs are selected as source and 11 classical statistical test methods are applied to compare the performance between the new type of RNG and its source. The results show that the new RNG can outperform its source RNG in most cases.