An exhaustive analysis of two-term multiple recursive random number generators with double precision floating point restricted multipliers

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Abstract

This paper performs an exhaustive search for the maximum spectral value in full period two-term k^{th}-order multiple recursive generators (kMRGs) with the double precision floating point (DF) restricted multipliers for orders $k = 2, 3, \ldots, 7$. For a two-term kMRG, computational experiment is conducted to compare and evaluate the numbers of the number of possible multipliers and the spectral values with those of the approximate factoring (AF) restricted multipliers. According to the experiments we perform, the results indicate differences exist among the numbers of possible multipliers for the AF and DF multiplier restrictions. We demonstrate that these differences can affect the performance of spectral tests.

Keywords and Phrases: *full period, multiple recursive generator, random number, spectral test.*