**MRG8**

1. This is a pseudorandom number generator based on the 8th order primitive

polynomial modulo 2^31-1.( Actually, there are two versions, mrg8dn and mrg8dnz2, as will be stated later.) This polynomial was provided by Prof. P. L’Ecuyer of Montreal University.

1. A Fortran source code and sample output are attached. This code was developed and ran on Fujitsu Primepower HPC2500.
2. This code uses the 8byte integer arithmetic and logical operations. Compiler option must be specified to allow those instructions. (For example. frt –KV9 for Fujitsu systems.)
3. In this routine, 0 is represented by 2^31-1. The initial integer seed must be between 1 and 2^31-1. The normalized random numbers take the value 0<x<=1.If one wishes to have 0<=x<1 instead, subtract 1 from the generated integer random numbers before normalization.
4. A multiplicative congruential random number generator mcg64ni is also provided to initialize mrg8. This is based on the generator described in Knuth’s book for modulus 2^64. In order to generate 8 initial seeds for mrg8, 8 random numbers are generated by this routine, and shifted right by 1 bit to fit the 31 bit format.
5. When the routine is called for the first time, the initialization one using iseed.

In the subsequent calls, iseed is ignored, ans the most recent sedds which are preserved in the routine are used.

1. The mrg8dn and mrgdnz2 produce the identical sequences, but mrg8dnz2 has a larger-sized buffer, so that operations of the past values takes place less frequently. This version may be faster on some platforms.
2. The timer routine in the main program is for Fujitsu Primepower 2500. In the “call clock(t0,2,2)”, the data type of t0 is double precision, and 2,2 means a double precision time is returned in microsecond. It should be replaced by an equivalent timer routine on other platforms. Due to a short measurement time, a high precision timer routine is desirale for benchmarking purposes

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12-23-14 K.Miura (English version)