A FAST VECTORISED IMPLEMENTATION OF WALLACE'S NORMAL RANDOM NUMBER GENERATOR

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Abstract

Wallace has proposed a new class of pseudo-random generators for normal variates. These generators do not require a stream of uniform pseudo-random numbers, except for initialisation. The inner loops are essentially matrix-vector multiplications and are very suitable for implementation on vector processors or vector/parallel processors such as the Fujitsu VPP300. In this report we outline Wallace's idea, consider some variations on it, and describe a vectorised implementation `RANN4` which is more than three times faster than its best competitors (the Polar and Box-Muller methods) on the Fujitsu VP2200 and VPP300.

Comments

Only the Abstract is given here. The full report appeared as [3] and a preliminary version as [2]. The idea is to vectorize Wallace's method [5]. For earlier (and slower) methods, see [1, 4].

References

[1] R. P. Brent, *Fast Normal Random Number Generators for Vector Processors*, Technical Report TR-CS-93-04, Computer Sciences Laboratory, Australian National University, March 1993. Also Area 4 working note #4. `ftp://nimbus.anu.edu.au/pub/Brent/rpb141tr.dvi.Z`

[2] R. P. Brent, *Wallace's fast normal random number generators: preliminary report*, Fujitsu Area 4 Project Report, October 1994, 6 pp.

[3] R. P. Brent, *A fast vectorised implementation of Wallace's normal random number generator,* Technical Report TR-CS-97-07, Computer Sciences Laboratory, Australian National University, April 1997, 9 pp. Also Area 4 Working Note # 21. `ftp://nimbus.anu.edu.au/pub/Brent/rpb170tr.dvi.Z`

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Date: 14 April 1997.

1991 *Mathematics Subject Classification.* Primary 65C10, Secondary 54C70, 60G15, 65Y10, 68U20.

Key words and phrases. Gaussian random numbers, maximum entropy, normal distribution, normal random numbers, pseudo-random numbers, random number generators, random numbers, simulation, vector processors, Wallace's method.

 rpb170a typeset using $\mathcal{AMS}$-LaTeX.