

NAG Numerical Functions for GPUs Function Document

nag_gpu_mrg32k3a_init

1 Purpose

nag_gpu_mrg32k3a_init initializes the Multiple Recursive Generator, MRG32k3a, formulated by L'Ecuyer (1999) and must precede any call to a distribution function such as **nag_gpu_mrg32k3a_uniform**. This function pre-computes the skip ahead matrices and copies these, together with the supplied seeds, to the device. No output is returned to the calling program.

2 Specification

```
#include <nag_gpu.h>
```

```
void nag_gpu_mrg32k3a_init (const unsigned int *v1, const unsigned int *v2,  
    unsigned long long offset)
```

3 References

L'Ecuyer P (1999) Good parameter sets for combined multiple recursive random number generators *Operations Research* **47:1** 159–164

4 Arguments

- 1: **v1**[3] – const unsigned int * *Input*
On entry: an array of three 32-bit unsigned integers to be used as seeds.
Constraint: $0 \leq v1(i) < m_1 = 2^{32} - 209$, for $i = 0, 1, 2$ and $v1(i) \neq 0$ for at least one i .
- 2: **v2**[3] – const unsigned int * *Input*
On entry: an array of three 32-bit unsigned integers to be used as seeds.
Constraint: $0 \leq v2(i) < m_2 = 2^{32} - 22853$, for $i = 0, 1, 2$ and $v2(i) \neq 0$ for at least one i .
- 3: **offset** – unsigned long long *Input*
On entry: the offset from the beginning of the sequence at which to start generating values.

5 Error Indicators and Warnings

No argument constraint checking is carried out by this function. You can insert a call to function **nag_gpu_utilCheckMsg** (contained in the header file **nag_gpu.h**) following the call to **nag_gpu_mrg32k3a_init** to check for the last CUDA error message, if any, generated during execution.

6 Example

There is no example program specifically for this function. The example programs for the generator functions such as **nag_gpu_mrg32k3a_uniform** and **nag_gpu_mrg32k3a_exp** show how this function should be used.
