

PHYS358: Session 07

Monte Carlo Integration (1): Random Number Generators

Key to a successful MCI is, of course, a random number generator (RNG). Chapter 7 of Numerical Recipes gives a summary. Just imagine you want to sample a three-dimensional grid with 1000 points in one dimension (this is by no means uncommon). You're already at 10^9 separate random events, requiring a RNG with at least a period of 10^9 , and hopefully longer if you want to repeat the experiment several times. Here, we explore a few tests of RNG qualities. For details, see the additional `rng_test.pdf`.

Step 1: Calling `mci_rng.py python` will run a test suite on the `numpy` RNG. Identify the plots with the help of the test descriptions in `rng_test.pdf`.

Step 2: Now call `mci_rng.py lincon`. This will run the test suite on a linear congruential RNG. Where does this agree with the previous test, where do you see differences? Would you trust this RNG?