Testing Random Numbers

3-4-2011

Opening Discussion

- What did we talk about in our last class?

- Minute essay responses:

  - Checks: variance and histogram.

  - Matlab not working. Alternatives? R? Octave?

Validating a Random Number Generator

- You should verify the quality of your random number generator.

- This can be done either empirically or theoretically.

- Empirical tests work on generated sequences.

- Theoretical tests require that you know something about the generator.

Empirical Tests

- You can do a chi-squared test on the generated values.

- This can be extended to the serial test where the test is done in higher dimensions.

  - This tests correlation of values.

- Runs test for correlation.

- Correlation between U_i and U_{i+j}.

- All of these are local.

Theoretical Tests

- These require more advanced math and knowing the details of the generator.

Monte-Carlo Simulations

- One of the other styles of simulations that we aren't focusing on significantly in this course is Monte-Carlo simulations.

- These involve pulling lots of random numbers. Typically used for systems with uncorrelated events.

- Calculating Pi or integrating higher dimensional spaces.

- Light scattering.

- Quantum simulations.

Disney Simulation

- I will spend Spring Break in Disney World. There are all types of things to simulate there.

- I want to spend some time talking about how we might do that.

Minute Essay

- Would you want to be a simulation expert working for Disney?