Efficiency

Even for a good choice of \( w \) (weighting function), we got \( 10^{-4} \) accuracy for \( N = 5000 \). But trapezoidal rule would give \( \approx 10^{-5} \) accuracy for some \( N = 5000 \).
Suppose we attempted a multi-dimensional integral with a given \( N \), then each dimension of the integral is broken up into \( n \) intervals of spacing \( \frac{1}{\sqrt{A}} \). The error in the volume cell \( h \) is in each integration region.
\( O(h^{d+2}) \), so the total error in “conventional” quadrature is: \( N \cdot O(h^{d+2}) \sim O(N^{-2/d}) \) *

For large \( d \), this decreases slowly with increasing \( N \).

But, Monte Carlo gives uncertainty decreasing as \( N^{-\frac{1}{2}} \), independent of \( d \). So, Monte Carlo is probably reasonable when \( d \geq 4 \).
Pseudo random number generators. Generate a new "next number" based on "present number." Needs "seed" to start the process.

Testing pseudo random numbers ("uniform deviates") random over $[0, 1]$.

Two things to test for:
1. Distribution
2. Independence
Distribution:

Use $\text{norm} \to 0$ as $n \to \infty$

Further reference:
Kolmogorov - Smirnov statistic
Compare to V. S. statistics.

Count # of run-ups (4-wrks)

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Run-up/down tests.

Prior-phishing

2. Impersonation

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