Statistical Methods in Particle Physics

Quiz on chapter 4: Monte Carlo Methods

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The name "Monte Carlo method" refers to

1. the inventor Carlo Montego
2. a conference which took place in Monte Carlo
3. the Monte Carlo Casino in Monaco
4. to the formula one race in Monte Carlo

Random numbers generated on a Computer are called pseudo-random numbers because

1. of the limited precision of floating point numbers
2. they result from deterministic algorithms
3. they are only generated in the interval [0,1]
4. they are taken from big look-up tables obtained from throwing real dice

In the inverse transform method to get random numbers from a distribution f(x) one needs to calculate the inverse of

1. f(x)
2. 1/f(x)
3. the first derivative of f(x)
4. the CDF of f(x)

Let r be a random variable uniformly distributed in [0, 1]. To draw random numbers from the PDF f(x) = 2x one can transform r as

1. $\sqrt{r}$
2. r^2
3. ln r
4. r^4

To obtain random points uniformly distributed on the surface of a sphere one needs to uniformly distribute

1. ϕ and θ
2. $\sin\phi$ and θ
3. ϕ and $\cos\theta$
4. ϕ^2 and θ

Monte Carlo integration outperforms other numerical methods in case of

1. multi-dimensional integrals
2. Gaussian integrals
3. positive integrands
4. periodic integrands