Discrete Random Variates

3/23/2009

Opening Discussion

- What did we talk about last class?
- Do you have any questions about things?

Generating Discrete Random Variates

- Now we want to work on how we pull values from discrete distributions.
- Most of the time we will use the inverse method.
- There are some other general methods that only work on discrete distributions.

Distributions

- Bernoulli
  - If U<=p return X=1 else X=0
- Discrete Uniform
  - Return X=i+floor((j-i+1)U)
- Binomial
  - Generate Y_i~Bernoulli(p) for i=1..t
  - Return X=sum(Y_i)

More Distributions

- Geometric
  - Return X=floor(ln U/ln(1-p))
- Negative Binomial
  - Generate Y_i~geom(p) for i=1..s
  - Return X=sum(Y_i)
- Poisson
  - $a=e^{-\lambda}$, b=1, i=0
  - Loop over i, b=bU, if b<a return X=i, else i++

Arbitrary Discrete Distribution

- The text also goes into several methods that can be used to generate arbitrary discrete distributions.
- The simplest of these requires a search. The others use additional storage so that no search is needed and instead they look values up in arrays.

What I did this weekend.

Minute Essay

- Questions?