Johns Hopkins Engineering

625.464 Computational Statistics

Squeezed Rejection Sampling

Module 4 Lecture 4D

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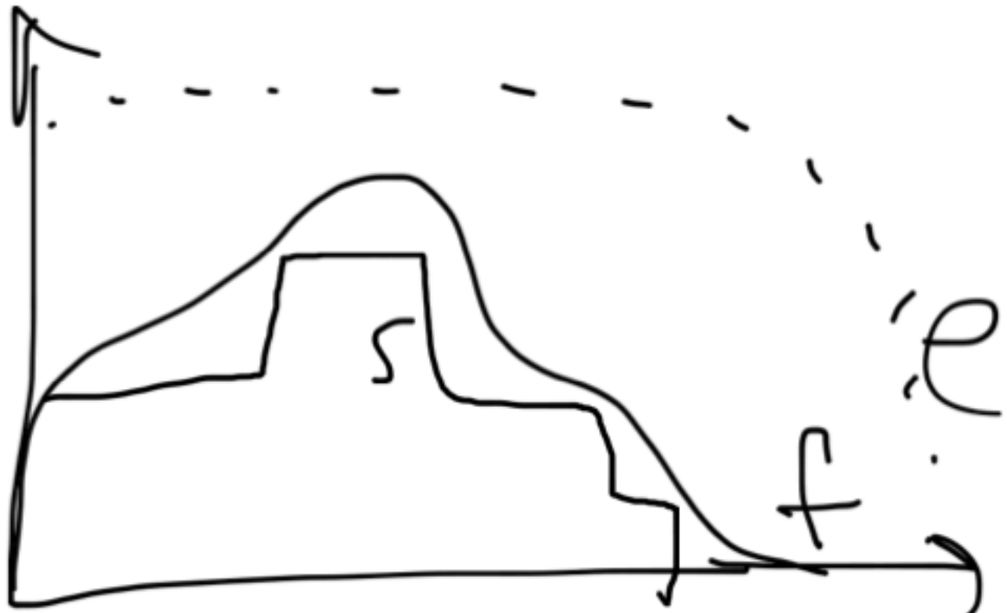
Why Squeezed Rejection Sampling?

Ordinary rejection sampling

1. Sample $y \sim g$
2. Sample $u \sim \text{Unif}(0,1)$
3. If $u > f(y)/e(y)$ reject
4. o.w. keep.

Squeezed Rejection Sampling
The Basic Idea



① $s(x) \leq f(x)$

② easy to compute

Squeezed rejection

① Sample $y \sim q$

② Sample $u \sim u(0,1)$

③ If $u \leq \frac{s(y)}{e(y)}$ Keep y
Set $y = x \rightarrow$ go to ⑥

④ check if $u \leq \frac{f(y)}{e(y)}$
if so keep $x = y$
→ go to ⑥

⑤ Reject $\frac{1}{r}$ start over

⑥ go to 1 until done

Pseudo code for Squeezed Rejection Sampling

Pseudo code for Squeezed Rejection Sampling.

Suppose you want to generate n random numbers from distribution f using S.R.S. w/ s, g and. $e = g/\alpha$.

Pseudocode

- Initialize constants n & α
- Initialize variables Y[n] = 0; accepted = 0
- While (accepted < n) {
    x = r.n. from g (sample g)
    u = r.n. from U(0,1) (sample U(0,1).
    s = s(x) (eval s at x)
    e = g(x)/α (eval e at x).

```
If (u ≤ s/e){
    accepted = accepted + 1
    y[accepted] = x
}
Else {
    f = f(x)
  If {u ≤ f/e) {
    accepted = accepted + 1
    y[accepted] = x
}
}
}
Return y
```