1) We choose c such that $c = \sup_x \frac{f(x)}{g(x)}$

2) If N is the no. of rejections to get the first obs. from f, then it can be shown that

$E(N) = c$

$\therefore$ Efficiency of the algorithm depends on c.

For practical purposes, g is chosen to ensure a smaller value of c.

3) The algorithm can also be used for discrete & multivariate distn.

Examples

1) Alternative to Box-Muller

$f = N(0,1)$

$g_1 = C(0,1)$

$g_2 = DE(0,1)$

$$c_1 = \sup_x \frac{f(x)}{g_1(x)} = \sup_x \left\{ \underbrace{e^{-x^2/2}(1+x^2)}_{\text{Max at } x = \pm 1} \sqrt{\frac{\pi}{2}} \right\}$$

$$\therefore c_1 = e^{-1/2} \cdot 2\sqrt{\frac{\pi}{2}} = \sqrt{\frac{2\pi}{e}} = 1.52$$

$$c_2 = \sup_x \frac{f(x)}{g_2(x)} = \sup_x \left\{ \frac{1}{\sqrt{2\pi}} \times 2 \underbrace{e^{-\frac{x^2}{2} + |x|}}_{\text{Max at } x = 1} \right\}$$

$$= \sqrt{\frac{2}{\pi}} \times e^{1/2} = \sqrt{\frac{2e}{\pi}} = 1.32$$