

TEMA:

23: $f(x) = \frac{e^x}{e-1}, 0 \leq x \leq 1$ (1)

Alg $Y \sim \text{Unif}(0,1), g(x) = \frac{1}{e-1}, 0 \leq x \leq 1$ (2)

$h(x) = \frac{f(x)}{g(x)} = e^x \Rightarrow h'(x) = x \cdot e^x$

x	0	1
$h'(x)$	0	+
$h(x)$	1	e

$\Rightarrow h(1) = e^1 \Rightarrow c = e$ (3)

$\Rightarrow \frac{f(x)}{c \cdot g(x)} = e^{x-1} \rightarrow$ Genera $U \sim \text{Unif}(\frac{1}{e}, 1)$
 Kaca $U \leq e^{x-1} \Rightarrow X = Y$

24: $f(x) = \begin{cases} \frac{x-2}{2}, & 2 \leq x \leq 3 \\ \frac{2-\frac{x}{3}}{2}, & 3 \leq x \leq 6 \end{cases}$

Jou $Y \sim \text{Unif}(2,6), g(x) = \frac{1}{4}, 2 \leq x \leq 6 \Rightarrow$

$\Rightarrow h(x) = \begin{cases} x-2, & x \in [2,3) \\ 2-\frac{x}{3}, & x \in [3,6] \end{cases} \Rightarrow h'(x) = \begin{cases} 1, & x \in (2,3) \\ -\frac{1}{3}, & x \in (3,6) \end{cases}$

x	2	3	6
$h'(x)$	+	+	-
$h(x)$	0	1	0

$\Rightarrow \frac{f(x)}{g(x) \cdot c} = h(x) \Rightarrow$ Genera $U \sim \text{Unif}(0,1)$

27: $f(x) = \frac{10^6}{336} \cdot x(1-x)^3, 0.8 \leq x \leq 1$

Jou $Y \sim \text{Unif}(0.8, 1), g(x) = \frac{10^6}{336}, x \in (0.8, 1)$

$h(x) = \frac{f(x)}{g(x)} = x(1-x)^3 \Rightarrow h'(x) = (1-x)^3 + x \cdot 3(1-x)^2 \cdot (-1) =$
 $= (1-x)^3 - 3x(1-x)^2 = (1-x)^2(1-x-3x) =$
 $= (1-x)^2(1-4x)$

$$\begin{array}{c|c} x & \frac{4}{5} \\ \hline f(x) & + + + + + \\ \hline h(x) & \end{array} \rightarrow h(1) = 0$$

$$h'(x) = 0 \Leftrightarrow (1-x)^2(1-4x) = 0 \quad (1-x)^2 = 0 \Leftrightarrow x^2 - 2x + 1 = 0 \Leftrightarrow \Delta = 4 - 4 = 0 \Rightarrow$$

$$\frac{10^6}{336} \approx 3x \sim$$

$$x = \frac{10^6}{1008}$$

$$(1-x)^2 = 0 \Rightarrow x_{1,2} = 1 \notin (0, 1)$$

$$x_3 = \frac{1}{4} \notin (0, 1)$$

$$x_{1,2} = 1$$

$$x = \frac{1}{3} = \frac{5}{15} \notin \left(\frac{4}{5}, 1\right)$$

$$\frac{4}{5} = \frac{12}{15}$$

26: $f(x) = \frac{1}{2} x^2 e^{-x}, x > 0$

Let $Y \sim \text{Unif}(0, 1)$ $g(x) = e^{-x}$

$$h(x) = \frac{f(x)}{g(x)} = \frac{1}{2} x^2$$

$$h'(x) = x \Rightarrow h'(x) = 0 \Leftrightarrow x = 0 \notin (0, 1)$$

25: $f(x) = \begin{cases} e^{2x}, & x \leq 0 \\ e^{-2x}, & x \geq 0 \end{cases}$

$$g(x) = \begin{cases} -\frac{1}{2} e^{2x}, & x < 0 \\ \frac{1}{2} e^{-2x}, & x > 0 \end{cases}$$

$$\Rightarrow h(x) = \begin{cases} -\frac{1}{2}, & x < 0 \\ \frac{1}{2}, & x > 0 \end{cases}$$

$$h'(x) = 0 \Rightarrow 0 = 0 \Rightarrow h\left(\frac{1}{2}\right) = e^{-1} = \frac{1}{e} \in (0, 1)$$

$$\Rightarrow \frac{f(x)}{g(x) \cdot c} = \begin{cases} -\frac{e}{2}, & x < 0 \\ \frac{e}{2}, & x > 0 \end{cases} \Rightarrow \text{Generate } U \sim \text{Unif}(0, 1)$$

Then $U \leq g$

$$28.2 \quad f(x) = \begin{cases} \frac{1}{a} \ln\left(\frac{a}{x}\right), & 0 < x < a, a > 0 \\ 0 & \text{rest} \end{cases}$$

$$g(x) = 1$$

$$h(x) = \frac{1}{a} \ln\left(\frac{a}{x}\right)$$

$$h'(x) = \frac{1}{a} \cdot \frac{x}{a} \cdot \left(\frac{-1}{x^2}\right) \cdot a \Rightarrow h'(x) = -\frac{1}{ax} \neq 0 \quad ?$$