hist95.eps

Keunbaik Lee : Problem 2.18

Given $\alpha \in [0,1]$, **We accept** $4U$, **if** $U \sim Uniform[0,1]$ **until** $U < \alpha$.

$$\begin{aligned} P(accepty) &= P(U \le y \mid U \le \alpha) \\ &= \frac{P(U \le y, U \le \alpha)}{P(U \le \alpha)} \\ &= \frac{y}{\alpha} \; if \; y \le \alpha, \\ & \quad 0 \; if \; y > \alpha \end{aligned}$$

This is c.d.f of $Uniform[0,\alpha]$.

To compare the rejection method with the transformation method, 10000 random numbers are generated in each methods. We do not figure out the special difference between two methods from the histogram(random number vs density) and plot(time vs random number) in each α **levels (**$\alpha = 0.95, 0.99, 0.995, 0.999$ **). The basic time series plot shows each random number plotted against its time. There is no special pattern in each method. From the lagged scatter plots of pairs of random numbers (**y_t **,**y_{t+m}**) of a time series separated by** m **time units for** $m = 1,2,3,4$. **The lagged plots also show us that there is no special pattern in each method. As** α **increases(0.95, 0.99, 0.995, 0.999), there is no special difference between two methods.**