Box-Muller 方法

- 用于生成高斯概率分布的样子.

Q 步骤   **A**
1. 对 $(0,1)$ 均匀分布 $z \to 2z-1$ 变换
2. 舍弃 $z_1^2 + z_2^2 \leq 1$ 以外点.
3. $P(z_1, z_2) = \frac{1}{\pi}$.
4. $\begin{cases} y_1 = z_1 \left(\frac{-2\ln r^2}{r^2} \right)^{\frac{1}{2}} \\ y_2 = z_2 \left(\frac{-2\ln r^2}{r^2} \right)^{\frac{1}{2}} \end{cases}$ $r^2 = z_1^2 + z_2^2$

y 的布是多少

Q y_1 与 y_2 的联合分布   **A**
1. $p(y_1, y_2) = P(z_1, z_2) \left| \frac{\partial(z_1, z_2)}{\partial(y_1, y_2)} \right|$
$= \left[\frac{1}{\sqrt{2\pi}} \exp\{ -\frac{y_1^2}{2} \} \right] \left[\frac{1}{\sqrt{2\pi}} \exp\{ -\frac{y_2^2}{2} \} \right]$.
2. y_1 与 y_2 独立
3. y_1 与 y_2 服从 $N(0,1)$