It was found that γ_{MP} in testing $H_\circ: \theta = 0$ vs $H_A: \theta = 1$ for the normal distribution $N(\theta, 1)$ using $n = 16, \alpha_{MP} = 0.05$ and $\beta_{MP} = 0.00914$

1- Approximate the bands $k_\circ$ and k_1 of γ_{SLRT} with the errors of γ_{MP}

$$k_\circ \approx k'_\circ = \frac{\alpha_{MP}}{1 - \beta_{MP}} = 0.0505$$

$$k_1 \approx k'_1 = \frac{1 - \alpha_{MP}}{\beta_{MP}} = 103.9387$$

2- Determine $\mathbb{E}(Z_i | H_\circ)$ and $\mathbb{E}(Z_i | H_A)$

$$Z_i = log\left(\frac{f(x_i; \theta_\circ)}{f(x_i; \theta_1)}\right)$$

$$= -\frac{1}{2}[x_i{}^2 - (x_i - 1)^2] = -\frac{1}{2}[2x_i - 1] = \frac{1}{2} - x_i$$

$$\mathbb{E}(Z_i | H_\circ) = \frac{1}{2} - \mathbb{E}(x_i | H_\circ) = \frac{1}{2} - 0 = \frac{1}{2}$$

$$\mathbb{E}(Z_i | H_1) = \frac{1}{2} - \mathbb{E}(x_i | H_1) = \frac{1}{2} - 1 = -\frac{1}{2}$$

3- Compute $\mathbb{E}(N | H_\circ)$ and $\mathbb{E}(N | H_A)$

$$\mathbb{E}(N | H_\circ) = \frac{\alpha^* \log(k'_\circ) + (1 - \alpha^*) \log(k'_1)}{\mathbb{E}(Z_i | H_\circ)}$$

$$= \frac{0.05(-2.9858) + 0.95(4.6438)}{0.5}$$

$$= 8.52464$$

$$\mathbb{E}(N | H_1) = \frac{(1 - \beta^*) \log(k'_\circ) + \beta^* \log(k'_1)}{\mathbb{E}(Z_i | H_1)}$$

$$= \frac{(1 - 0.00914)(-2.9858) + 0.00914(4.6438)}{-0.5}$$

$$= 5.832$$

It was found that γ_{MP} in testing $H_{\circ}: \theta = 1$ vs $H_A: \theta = \frac{1}{2}$ for the Gamma distribution $Gamma(5, \theta)$ using $n = 6, \alpha_{MP} = 0.05$ and $\beta_{MP} = 0.03$

1- Approximate the bands $k_{\circ}$ and k_1 of γ_{SLRT} with the errors of γ_{MP}
2- Determine $\mathbb{E}(Z_i|H_{\circ})$ and $\mathbb{E}(Z_i|H_1)$
3- Compute $\mathbb{E}(Z_i|H_{\circ})$ and $\mathbb{E}(Z_i|H_1)$