LAB 3

Q_1 :

a) $\begin{bmatrix} 6 & 5 & 8 & 7 \\ 4 & 2 & 3 & 8 \\ 1 & 8 & 6 & 1 \end{bmatrix}$ $\quad h = \begin{bmatrix} 0 & 2 & 1 & 1 & 1 & 1 & 2 & 1 & 3 \end{bmatrix}$

0 1 2 3 4 5 6 7 8

$\tau_0 = 4$ $\quad \begin{cases} \mu_\triangleleft = \dfrac{m_1[4]}{m_0[4]} = \dfrac{0\times0 + 1\times2 + 2\times1 + 3\times1 + 4\times1}{0+2+1+1+1} = \dfrac{11}{5} \\ \mu_\triangleright = \dfrac{m_1[8] - m_1[4]}{m_0[8] - m_0[4]} = \dfrac{5\times1 + 6\times2 + 7\times1 + 8\times3}{1+2+1+3} = \dfrac{43}{7} \end{cases}$

$\tau_1 = \dfrac{\mu_\triangleleft + \mu_\triangleright}{2} = \dfrac{317}{70} \simeq 5^{*}$ $\quad \begin{cases} \mu_\triangleleft = \dfrac{m_1[5]}{m_0[5]} = \dfrac{16}{6} \\ \mu_\triangleright = \dfrac{m_1[8] - m_1[5]}{m_0[8] - m_0[5]} = \dfrac{43}{6} \end{cases}$

$\tau_2 = \dfrac{\mu_\triangleleft + \mu_\triangleright}{2} = \dfrac{59}{12} \simeq 5^{**}$

$*, ** \rightarrow \tau_1 = \tau_2 = 5$

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b) $m_0[0] = 0$

$m_1[0] = 0\times0 = 0$

$\mu = \dfrac{m_1[8]}{m_0[8]} = \dfrac{59}{12}$

$\hat{\sigma}_b^2 = 0$

$$\delta_b^2 = \left(m_1[n] - M m_0[n]\right)^2 / \left(m_0[n] \times (m_0[6] - m_0[n])\right)$$

$n=0 \rightarrow \delta_b^2 = \text{undefined}$

$n=1 \rightarrow \begin{cases} m_0[1] = 2 \\ m_1[1] = 2 \end{cases} \rightarrow \delta_b^2 = \left(2 - \frac{59}{12} \times 2\right)^2 / (2 \times 10) = 3.068 \rightarrow \hat{\delta}_b^2 = 3.068, T = 1$

$n=2 \rightarrow \begin{cases} m_0[2] = 3 \\ m_1[2] = 4 \end{cases} \rightarrow \delta_b^2 = \left(4 - \frac{59}{12} \times 3\right)^2 / (3 \times 9) = 4.280 \rightarrow \hat{\delta}_b^2 = 4.280, T = 2$

$n=3 \rightarrow \begin{cases} m_0[3] = 4 \\ m_1[3] = 7 \end{cases} \rightarrow \delta_b^2 = \left(7 - \frac{59}{12} \times 4\right)^2 / (4 \times 8) = 5.014 \rightarrow \hat{\delta}_b^2 = 5.014, T = 3$

$n=4 \rightarrow \begin{cases} m_0[4] = 5 \\ m_1[4] = 11 \end{cases} \rightarrow \delta_b^2 = \left(11 - \frac{59}{12} \times 5\right)^2 / (5 \times 7) = 5.271 \rightarrow \hat{\delta}_b^2 = 5.271, T = 4$

$n=5 \rightarrow \begin{cases} m_0[5] = 6 \\ m_1[5] = 16 \end{cases} \rightarrow \delta_b^2 = \left(16 - \frac{59}{12} \times 6\right)^2 / (6 \times 6) = \underline{5.062} < \hat{\delta}_b^2$

$n=6 \rightarrow \begin{cases} m_0[6] = 8 \\ m_1[6] = 28 \end{cases} \rightarrow \delta_b^2 = \left(28 - \frac{59}{12} \times 8\right)^2 / (8 \times 4) = \underline{4.014} < \hat{\delta}_b^2$

$n=7 \rightarrow \begin{cases} m_0[7] = 9 \\ m_1[7] = 35 \end{cases} \rightarrow \delta_b^2 = \left(35 - \frac{59}{12} \times 9\right)^2 / (9 \times 3) = \underline{3.169} < \hat{\delta}_b^2$

$n=8 \rightarrow \begin{cases} m_0[8] = 12 \\ m_1[8] = 59 \end{cases} \rightarrow \delta_b^2 = \left(59 - \frac{59}{12} \times 12\right)^2 / (12 \times 0) = \text{undefined}$

$$\begin{cases} \hat{\delta}_b^2 = 5.271 \\ T = 4 \end{cases}$$