قائمة قوانين رقم (2) (الاختبار الثاني)

قوانين الجزء الرابع

تحليل التباين في اتجاه واحد مع تساوي حجوم العينات::

$$N = kn$$

$$\mathrm{CF} = \frac{\mathrm{Y}_{\bullet\bullet}{}^2}{\mathrm{N}}$$

$$SS_{Total} = \sum_{\mathrm{i}=1}^{\mathrm{k}} \sum_{\mathrm{j}=1}^{\mathrm{n}} \mathrm{Y}_{\mathrm{ij}}{}^2 - \mathrm{CF}$$

$$df_{Total} = \mathrm{N} - 1 = \mathrm{nk} - 1$$

$$SS_{Trt} = \frac{1}{n} \sum_{\mathrm{i}=1}^{\mathrm{k}} \mathrm{Y}_{\mathrm{i}\bullet}{}^2 - \mathrm{CF}$$

$$df_{Trt} = k - 1$$

$$SS_E = SS_{Total} - SS_{Trt}$$

$$df_E = N - k$$

$$\mathrm{S}_{\bar{\mathrm{Y}}_{i\bullet}} = \sqrt{\frac{\mathrm{MSE}}{\mathrm{n}}}$$

$$\mathrm{S}_{\bar{\mathrm{Y}}_{i\bullet} - \bar{\mathrm{Y}}_{k\bullet}} = \sqrt{\frac{2\mathrm{MSE}}{\mathrm{n}}}$$

تحليل التباين للتصنيف الأحادي مع عدم تساوي حجوم العينات:

$$N = \sum_{i=1}^{k} n_i$$

$$SS_{Total} = \sum_{\mathrm{i}=1}^{\mathrm{k}} \sum_{\mathrm{j}=1}^{\mathrm{n_i}} \mathrm{Y}_{\mathrm{ij}}{}^2 - \mathrm{CF}$$

$$SS_{Trt} = \sum_{\mathrm{i}=1}^{\mathrm{k}} \frac{\mathrm{Y}_{\mathrm{i}\bullet}{}^2}{n_i} - CF$$

$$SS_E = SS_{Total} - SS_{Trt}$$

$$\mathrm{S}_{\bar{\mathrm{Y}}_{i\bullet}} = \sqrt{\frac{\mathrm{MSE}}{\mathrm{n_i}}}$$

$$\mathrm{S}_{\bar{\mathrm{Y}}_{i\bullet} - \bar{\mathrm{Y}}_{j\bullet}} = \sqrt{\mathrm{MSE}\left(\frac{1}{\mathrm{n_i}} + \frac{1}{\mathrm{n_j}}\right)}$$

تحليل التباين الثنائي (للنموذج الجمعي):

$$\mathrm{N} = \mathrm{ab}$$

$$\mathrm{CF} = \frac{\mathrm{Y}_{\bullet\bullet}{}^2}{\mathrm{ab}}$$

$$SST = \sum_{\mathrm{i}=1}^{\mathrm{a}} \sum_{\mathrm{j}=1}^{\mathrm{b}} \mathrm{Y}_{\mathrm{ij}}{}^2 - \mathrm{CF}$$

$$SSA = \frac{1}{b} \sum_{\mathrm{i}=1}^{a} \mathrm{Y}_{\mathrm{i}\bullet}{}^2 - \mathrm{CF}$$

$$SSB = \frac{1}{a} \sum_{\mathrm{j}=1}^{b} \mathrm{Y}_{\bullet j}{}^2 - \mathrm{CF}$$

$$SSE = SST - SSA - SSB$$

$$df_T = ab - 1$$

$$df_A = a - 1$$

$$df_B = b - 1$$

$$df_E = (a-1)(b-1)$$

$$\mathrm{S}_{\bar{\mathrm{Y}}_{i\bullet}} = \sqrt{\frac{\mathrm{MSE}}{b}}$$

$$\mathrm{S}_{\bar{\mathrm{Y}}_{i\bullet} - \bar{\mathrm{Y}}_{k\bullet}} = \sqrt{\frac{2\mathrm{MSE}}{b}}$$

$$\mathrm{S}_{\bar{\mathrm{Y}}_{\bullet j}} = \sqrt{\frac{\mathrm{MSE}}{a}}$$

$$\mathrm{S}_{\bar{\mathrm{Y}}_{\bullet j} - \bar{\mathrm{Y}}_{\bullet \mathrm{m}}} = \sqrt{\frac{2\mathrm{MSE}}{a}}$$

$$V^* = \frac{\lambda}{C}$$

$$\lambda = (N-k)\ln\left(S_p^2\right) - \sum_{i=1}^{k}(n_i - 1)\ln(\mathrm{S_i^2})$$

$$C = 1 + \frac{1}{3(k-1)}\left(\sum_{i=1}^{k}\frac{1}{n_i - 1} - \frac{1}{N-k}\right)$$

$$S_p^2 = \frac{\sum_{\mathrm{i}=1}^{\mathrm{k}}(n_i - 1)S_i^2}{N-k} = MSE$$

قوانين الجزء الخامس

التصميم تام العشوائية في حالة تساوي التكرارات:

$$\mathrm{N} = \mathrm{kn}$$

$$\mathrm{CF} = \frac{\mathrm{Y}_{\bullet\bullet}{}^2}{\mathrm{N}}$$

$$SS_{Total} = \sum_{\mathrm{i}=1}^{\mathrm{k}} \sum_{\mathrm{j}=1}^{\mathrm{n}} \mathrm{Y}_{\mathrm{ij}}{}^2 - \mathrm{CF}$$

$$df_{Total} = N - 1$$

$$SS_{Trt} = \frac{1}{n} \sum_{\mathrm{i}=1}^{\mathrm{k}} \mathrm{Y}_{\mathrm{i}\bullet}{}^2 - \mathrm{CF}$$

$$df_{Trt} = k - 1$$

$$SS_E = SS_{Total} - SS_{Trt}$$

$$df_E = N - k$$

$$\hat{\mu}_i = \bar{Y}_{i\bullet}$$

$$\bar{Y}_{i\bullet} \pm t_{\alpha/2}\, S_{\bar{Y}_{i\bullet}}$$

$$S_{\bar{Y}_{i\bullet}} = \sqrt{\frac{MSE}{n}}$$

$$\hat{\mu}_i - \hat{\mu}_j = \bar{Y}_{i\bullet} - \bar{Y}_{j\bullet}$$

$$(\bar{Y}_{i\bullet} - \bar{Y}_{j\bullet}) \pm t_{\alpha/2}\, S_{\bar{Y}_{i\bullet} - \bar{Y}_{j\bullet}}$$

$$S_{\bar{Y}_{i\bullet} - \bar{Y}_{j\bullet}} = \sqrt{\frac{2MSE}{n}}$$

التصميم تام العشوائية في حالة عدم تساوي التكرارات:

$$N = \sum_{i=1}^{k} n_i$$

$$SS_{Total} = \sum_{i=1}^{k}\sum_{j=1}^{n_i} Y_{ij}{}^2 - CF$$

$$SS_{Trt} = \sum_{i=1}^{k} \frac{Y_{i\bullet}{}^2}{n_i} - CF$$

$$SS_E = SS_{Total} - SS_{Trt}$$

$$df_{Total} = N - 1$$

$$df_{Trt} = k - 1$$

$$df_E = N - k$$

$$S_{\bar{Y}_{i\bullet}} = \sqrt{\frac{MSE}{n_i}}$$

$$S_{\bar{Y}_{i\bullet}-\bar{Y}_{j\bullet}} = \sqrt{MSE\left(\frac{1}{n_i}+\frac{1}{n_j}\right)}$$

$$\bar{Y}_{i\bullet} \pm t\alpha_{/2}\, S_{\bar{Y}_{i\bullet}}$$

$$\left(\bar{Y}_{i\bullet} - \bar{Y}_{j\bullet}\right) \pm t\alpha_{/2}\, S_{\bar{Y}_{i\bullet}-\bar{Y}_{j\bullet}}$$

التصميم تام العشوائية مع معاينة الوحدات التجريبية:

$$N = tns$$

$$CF = \frac{Y_{\bullet\bullet\bullet}^2}{N} = \frac{Y_{\bullet\bullet\bullet}^2}{tns}$$

$$SS_{Total} = \sum_{i=1}^{t}\sum_{j=1}^{n}\sum_{k=1}^{s} Y_{ijk}^2 - CF$$

$$SS_{Trt} = \frac{1}{ns}\sum_{i=1}^{t} Y_{i\bullet\bullet}^2 - CF$$

$$SS_E = \frac{1}{s}\sum_{i=1}^{t}\sum_{j=}^{n} Y_{ij\bullet}^2 - CF - SS_{Trt}$$

$$= \frac{1}{s}\sum_{i=1}^{t}\sum_{j=}^{n} Y_{ij\bullet}^2 - \frac{1}{ns}\sum_{i=1}^{t} Y_{i\bullet\bullet}^2$$

$$SS_S = SS_{Total} - SS_{Trt} - SS_E$$

$$df_{Total} = N - 1$$

$$df_{Trt} = t - 1$$

$$df_E = tn - t = t(n-1)$$

$$df_S = tns - tn = tn(s-1)$$

$$S_{\bar{Y}_{i\bullet\bullet}} = \sqrt{\frac{MSE}{ns}}$$

$$S_{\bar{Y}_{i\bullet\bullet}-\bar{Y}_{j\bullet\bullet}} = \sqrt{\frac{2MSE}{ns}}$$

$$\bar{Y}_{i\bullet\bullet} \pm t\alpha_{/2}\, S_{\bar{Y}_{i\bullet\bullet}}$$

$$(\bar{Y}_{i\bullet\bullet} - \bar{Y}_{j\bullet\bullet}) \pm t\alpha_{/2}\, S_{\bar{Y}_{i\bullet\bullet}-\bar{Y}_{j\bullet\bullet}}$$

قوانين الجزء السادس

$$Q = \sum_{i=1}^{t} \lambda_i \mu_i$$

$$\sum_{i=1}^{t} \lambda_i = 0$$

$$\hat{Q} = \sum_{i=1}^{t} \lambda_i \bar{Y}_i$$

$$S_{\hat{Q}} = \sqrt{MSE \sum_{i=1}^{t} \frac{\lambda_i^2}{n_i}}$$

$$t^* = \frac{\hat{Q}}{S_{\hat{Q}}} = \frac{\hat{Q}}{\sqrt{MSE \sum_{i=1}^{t} \frac{\lambda_i^2}{n_i}}}$$

$$\hat{Q} \pm t_{\frac{\alpha}{2}} S_{\hat{Q}}$$

$$\sum_{i=1}^{t} \lambda_i \bar{Y}_i \pm t_{\frac{\alpha}{2}} \sqrt{MSE \sum_{i=1}^{t} \frac{\lambda_i^2}{n_i}}$$

$$t^* = \frac{\bar{Y}_i - \bar{Y}_j}{S_{\bar{Y}_i - \bar{Y}_j}}$$

$$S_{\bar{Y}_i - \bar{Y}_j} = \sqrt{MSE\left(\frac{1}{n_i}+\frac{1}{n_j}\right)}$$

$$LSD_{ij} = t_{\frac{\alpha}{2}}(df_E)\, S_{\bar{Y}_i - \bar{Y}_j} = t_{\frac{\alpha}{2}}(df_E)\sqrt{MSE\left(\frac{1}{n_i}+\frac{1}{n_j}\right)}$$

$$LSD = t_{\frac{\alpha}{2}}(df_E)\sqrt{\frac{2MSE}{n}}$$

$$D_i = d_\alpha(t-1, df_E)\sqrt{MSE\left(\frac{1}{n_i}+\frac{1}{n_t}\right)}$$

$$S_{\bar{Y}_i - \bar{Y}_t} = \sqrt{MSE\left(\frac{1}{n_i}+\frac{1}{n_t}\right)}$$

$$(\bar{Y}_i - \bar{Y}_t) \pm D_i$$

$$(\bar{Y}_i - \bar{Y}_t) \pm d_\alpha(t-1, df_E)\sqrt{MSE\left(\frac{1}{n_i}+\frac{1}{n_t}\right)}$$

ملاحظة: على الطالب معرفة القوانين الأخرى التي لم تُدرج هنا.