F值

處理 SSTR = 888　2　$MSTR = \frac{888}{2} = 444$　$\frac{444}{50} = 8.88$

集區 SSB = 78　3　$MSB = \frac{78}{3} = 26$　$\frac{26}{50} = 0.52$

隨機誤差 SSE = 300　2×3 = 6　$MSE = \frac{300}{6} = 50$

總差異 SST = 1266　12−1 = 11

(1) $8.88 > F_{0.05}(6,2) = 5.14$，有顯著差異

(2) $0.52 < F_{0.05}(6,3) = 4.76$，無顯著差異

例 9.10
1　0.88　0.64　0.82　0.76　0.05　$T_1 = 3.15$　$\bar{y}_1 = 0.63$
2　1.54　1.78　1.29　1.53　1.91　1.14　$T_2 = 9.19$　$\bar{y}_2 = 1.53$
3　1.98　1.51　1.78　2.20　1.72　2.25　$T_3 = 11.44$　$\bar{y}_3 = 1.91$
$T = 23.78$　$\bar{y} = 1.40$

$H_0: \mu_1 = \mu_2 = \mu_3$

H_1: μ 不相等

$\sum_{i=1}^{3}\sum_{j=1}^{n_i} y_{ij}^2 = 0.88^2 + 0.64^2 + \dots + 2.25^2 = 39.159$

$SST = 39.159 - \frac{(23.78)^2}{17} = 5.895$

$SSTR = 37.8729833333 - \frac{(23.78)^2}{17} = 4.609$

$SSE = SST - SSTR = 1.286$

減肥藥 SSTR = 4.609　3−1 = 2

隨機誤差 SSE = 1.286　17−3 = 14

總和 SST = 5.895　17−1 = 16

$MSTR = \frac{4.609}{2} = 2.305$　$F = \frac{MSTR}{MSE} = \frac{2.305}{0.092} = 25.05$

$MSE = \frac{1.286}{14} = 0.092$　$\because F = 25.05 > F_{0.05}(2,14) = 3.74$

∴ 拒絕 H_0，三種減肥藥有顯著差異

例 9.12　$m = \binom{3}{2} = 3$，$F_{0.05}(3-1, 17-3) = 3.74$

$s = \sqrt{MSE} = \sqrt{\frac{SSE}{n-k}} = \sqrt{\frac{1.286}{14}} = \sqrt{0.092} = 0.303$，$\sqrt{(k-1)F} = \sqrt{2 \times 3.74}$

$\mu_2 - \mu_1 = (1.53 - 0.63) \pm 2.73 \times 0.303 \times \sqrt{\frac{1}{6} + \frac{1}{5}} = (0.399, 1.401)$

$\mu_3 - \mu_2 = (1.91 - 1.53) \pm 2.73 \times 0.303 \times \sqrt{\frac{1}{6} + \frac{1}{5}} = (-0.08?, 0.881)$

$\mu_3 - \mu_1 = (1.91 - 0.63) \pm 2.73 \times 0.303 \times \sqrt{\frac{1}{6} + \frac{1}{5}} = (0.779, 1.781)$

只有減肥藥2跟減肥藥3之間無明顯差