

統計分析法 第4週レポート

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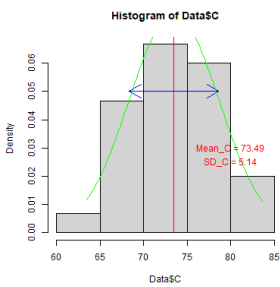
2023/10/31

1 設問 1

H_0 は A, B, C の母平均に差がない, H_1 は A, BC の母平均に差がある。

2 設問 2

A 群の平均体重は 60.9742, 標準偏差は 16.03058。B 群の平均体重は 59.976, 標準偏差は 15.94809。



3 設問 3

データ数 = 90, 自由度 = (2, 87), $F = 5.351, p = 0.00643$

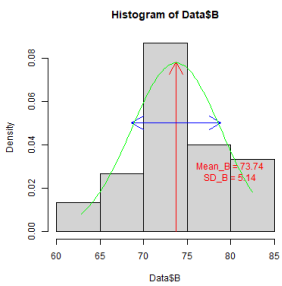
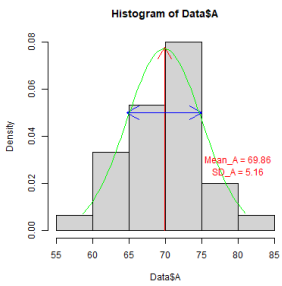
4 設問 4

p 値が優位水準を満たさないで, H_0 は棄却され, A, B, C の母平均には差があると結論できる。

5 設問 5

図 1 s2212022-1.c

1 One-way analysis of means (not
2 assuming equal variances)
3 data: 投与データ and 薬の種類
F = 5.2729, num df = 2, denom df =
58, p-value = 0.00787



6 設問 6

$283.4/283.4 + 2303.9$

7 ソースコード

図 2 s2212022-1.c

```
1      #課題1
2      #仮説H0:三群の母平均値は等しい
3      #帰無仮説H1:三群の母平均値は等しくない
4
5      #課題2
6      Data <- read.table("week4-example.txt",
7                          header=TRUE)
8      Mean_A <- mean(Data$A)
9      Mean_B <- mean(Data$B)
10     Mean_C <- mean(Data$C)
11     Mean_A
12     Mean_B
13     Mean_C
14     SD_A <- sd(Data$A)
15     SD_B <- sd(Data$B)
16     SD_C <- sd(Data$C)
17     SD_A
18     SD_B
19     SD_C
20     #グラフ描画(A)
21     png("4-2-1.png", width = 400, height =
22         400)
23     hist(Data$A,freq=FALSE)
24     # 矢印を描画
25     arrows(x0 = Mean_A, y0 = 0.078, x1 =
26         Mean_A, y1 = 0, col = "red", code = 1,
27         angle = 30)
28     arrows(x0 = Mean_A + SD_A, y0 = 0.05,
29         x1 = Mean_A, y1 = 0.05, col = "blue",
30         code = 1, angle = 30)
31     arrows(x0 = Mean_A - SD_A, y0 = 0.05,
32         x1 = Mean_A, y1 = 0.05, col = "blue",
33         code = 1, angle = 30)
34     # 正規分布で近似した曲線を追加
35     x <- seq(min(Data$A), max(Data$A),
36         length = 100)
37     y <- dnorm(x, mean = Mean_A, sd = SD_A)
38     lines(x, y, col = "green")
39     text(80,0.030,labels = paste("Mean_A=",
40         round(Mean_A, 2)), col = "red")
```

```
41     text(80,0.025,labels = paste("SD_A=",
42         round(SD_A, 2)), col = "red")
43     dev.off()
44
45     #グラフ描画(B)
46     png("4-2-2.png", width = 400, height =
47         400)
48     hist(Data$B,freq=FALSE)
49     # 矢印を描画
50     arrows(x0 = Mean_B, y0 = 0.078, x1 =
51         Mean_B, y1 = 0, col = "red", code = 1,
52         angle = 30)
53     arrows(x0 = Mean_B + SD_B, y0 = 0.05,
54         x1 = Mean_B, y1 = 0.05, col = "blue",
55         code = 1, angle = 30)
56     arrows(x0 = Mean_B - SD_B, y0 = 0.05,
57         x1 = Mean_B, y1 = 0.05, col = "blue",
58         code = 1, angle = 30)
59     # 正規分布で近似した曲線を追加
60     x <- seq(min(Data$B), max(Data$B),
61         length = 100)
62     y <- dnorm(x, mean = Mean_B, sd = SD_B)
63     lines(x, y, col = "green")
64     text(80,0.030,labels = paste("Mean_B=",
65         round(Mean_B, 2)), col = "red")
66     text(80,0.025,labels = paste("SD_B=",
67         round(SD_B, 2)), col = "red")
68     dev.off()
69
70     #グラフ描画(C)
71     png("4-2-3.png", width = 400, height =
72         400)
73     hist(Data$C,freq=FALSE)
74     # 矢印を描画
75     arrows(x0 = Mean_C, y0 = 0.078, x1 =
76         Mean_C, y1 = 0, col = "red", code = 1,
77         angle = 30)
78     arrows(x0 = Mean_C + SD_C, y0 = 0.05,
79         x1 = Mean_C, y1 = 0.05, col = "blue",
80         code = 1, angle = 30)
81     arrows(x0 = Mean_C - SD_C, y0 = 0.05,
82         x1 = Mean_C, y1 = 0.05, col = "blue",
83         code = 1, angle = 30)
84     # 正規分布で近似した曲線を追加
85     x <- seq(min(Data$C), max(Data$C),
86         length = 100)
87     y <- dnorm(x, mean = Mean_C, sd = SD_C)
88     lines(x, y, col = "green")
89     text(80,0.030,labels = paste("Mean_C=",
90         round(Mean_C, 2)), col = "red")
91     text(80,0.025,labels = paste("SD_C=",
92         round(SD_C, 2)), col = "red")
93     dev.off()
```

```

65 #課題3
66
67 #各郡データに分解
68 Data_A <- Data$A
69 Data_B <- Data$B
70 Data_C <- Data$C
71
72 #投与データ(Dataをすべてまとめた変数)を
  用意する
73 投与データ <- c(Data_A,Data_B,Data_C)
74
75 #葉の種類別ラベルを作成する
76 葉の種類 <- c(rep("Data_A",30),rep("
  Data_B",30),rep("Data_C",30))
77
78 #要因型ベクトルに分解
79 葉の種類 <- factor(葉の種類)
80
81 #aov関数の実行
82 summary(aov(投与データ~葉の種類))
83
84 #課題4
85 #p = 0.006となり優位水準を満たさないこと
  から,4群の母平均は等しくないと結論でき
  る
86
87 #課題5
88
89 oneway.test(投与データ~葉の種類,var.
  equal=FALSE)
90 #今回は対応がある場合の分散分析なので
91 #F=283.4/283.4+2303.9

```