Kelompok TI E:

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Data: Position of Muscele Caveolae

Position of Muscle Caveolae

Description

The cav data frame has 138 rows and 2 columns.

The data gives the positions of the individual caveolae in a square region with sides of length 500 units. This grid was originally on a 2.65mum square of muscle fibre. The data are those points falling in the lower left hand quarter of the region used for the dataset `caveolae.dat` in the spatial package by B.D. Ripley (1994).

Usage

```
cav
```

Format

This data frame contains the following columns:

x

The x coordinate of the caveola's position in the region.

y

The y coordinate of the caveola's position in the region.

References

Appleyard, S.T., Witkowski, J.A., Ripley, B.D., Shotton, D.M. and Dubowicz, V. (1985) A novel procedure for pattern analysis of features present on freeze fractured plasma membranes. *Journal of Cell Science*, **74**, 105–117.

Davison, A.C. and Hinkley, D.V. (1997) *Bootstrap Methods and Their Application*. Cambridge University Press.

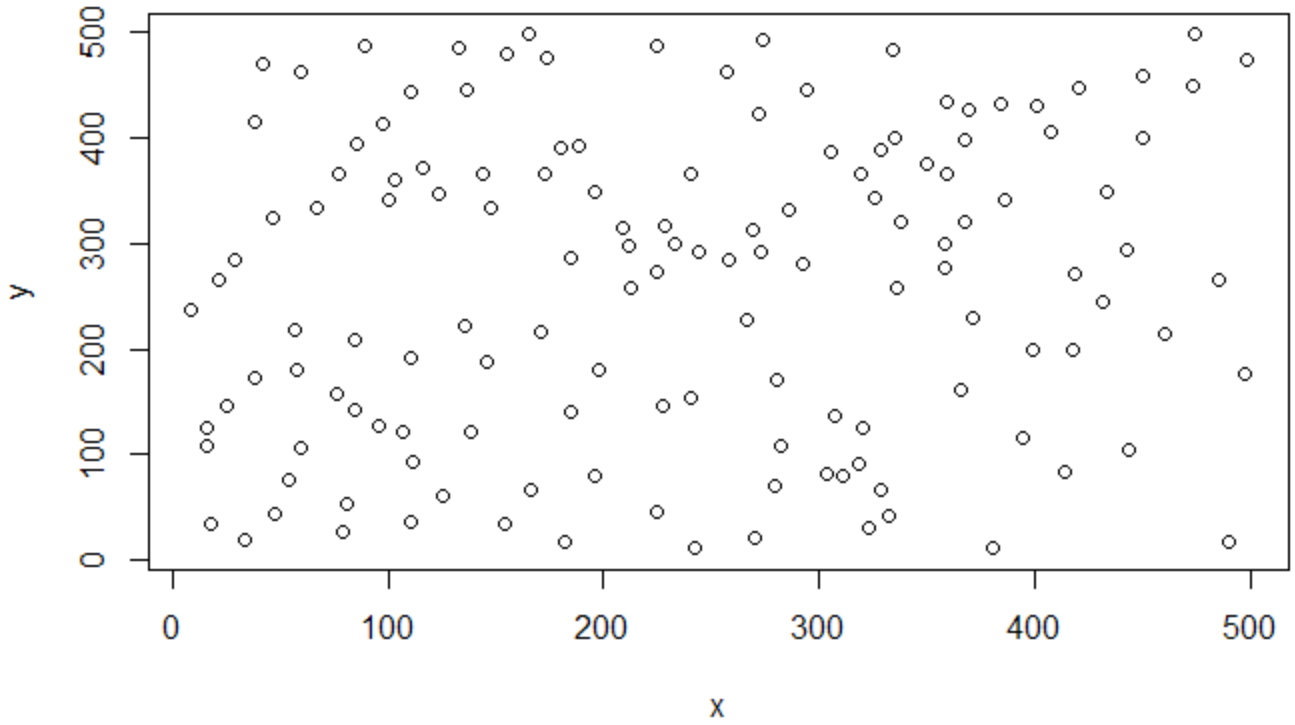
```
> # membaca data
> cav <- read.csv(file="C:/Users/LENOVO/OneDrive/Documents/Learning R/Semester 2/cav.csv", head=TRUE)
> cav
   rownames   x   y
1         1 498 475
2         2 474 498
3         3 473 449
4         4 450 459
5         5 420 447
6         6 401 430
7         7 384 433
8         8 369 426
9         9 359 435
10       10 334 483
```

11	11	272	424
12	12	294	445
13	13	274	493
14	14	257	463
15	15	225	488
16	16	165	498
17	17	174	477
18	18	155	480
19	19	137	445
20	20	111	443
21	21	133	486
22	22	60	462
23	23	42	470
24	24	38	416
25	25	98	414
26	26	89	488
27	27	86	395
28	28	77	366
29	29	67	334
30	30	47	325
31	31	100	341
32	32	103	360
33	33	116	372
34	34	124	347
35	35	144	367
36	36	180	390
37	37	188	393
38	38	173	367
39	39	196	349
40	40	148	334
41	41	209	315
42	42	228	316
43	43	240	366
44	44	286	332
45	45	269	313
46	46	305	387
47	47	319	366
48	48	328	389
49	49	335	401
50	50	367	399
51	51	350	376
52	52	359	366
53	53	326	343
54	54	338	320
55	55	367	320
56	56	386	341
57	57	407	406
58	58	450	401
59	59	433	350
60	60	485	266
61	61	442	295
62	62	418	271
63	63	431	245
64	64	460	214
65	65	371	230
66	66	358	278
67	67	358	299
68	68	336	259
69	69	292	281
70	70	273	292
71	71	244	293
72	72	258	284
73	73	233	299
74	74	212	297
75	75	225	273
76	76	213	259
77	77	266	228
78	78	185	286
79	79	136	222
80	80	171	216
81	81	85	209
82	82	57	218

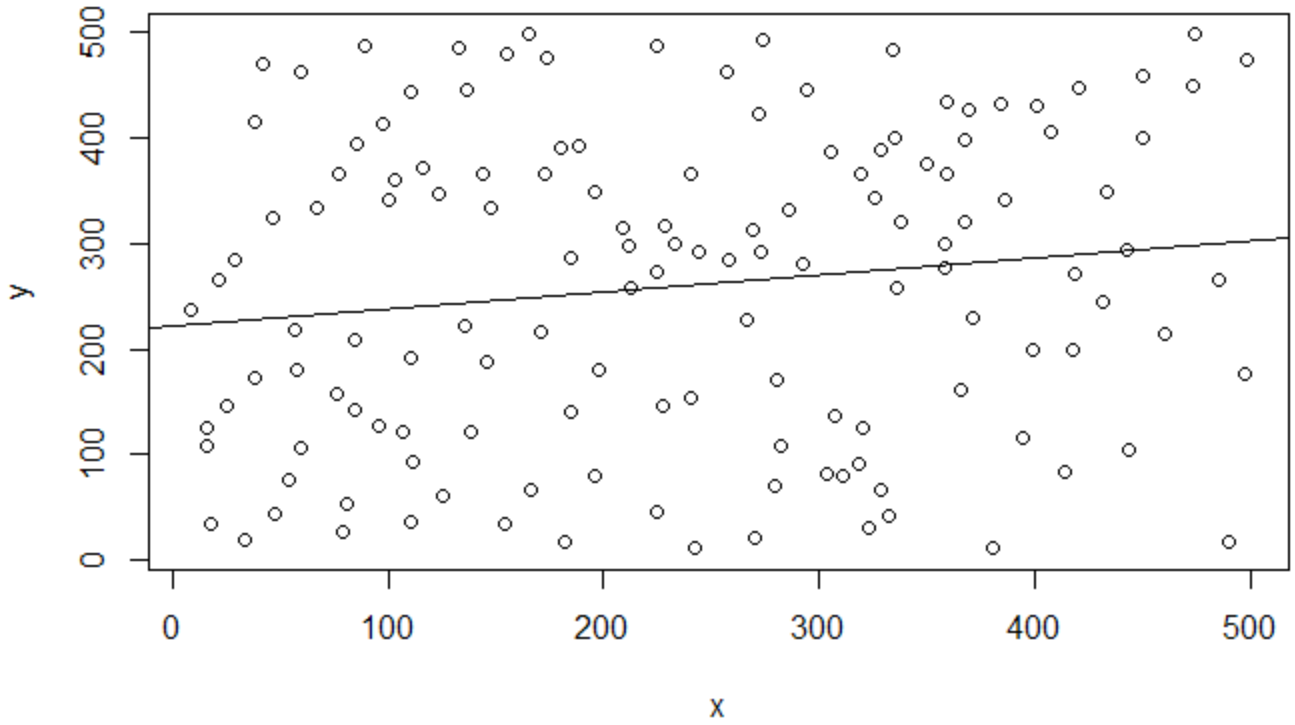
```
83         83  29 284
84         84  22 266
85         85   9 237
86         86  16 108
87         87  16 126
88         88  25 146
89         89  58 181
90         90  38 173
91         91  76 158
92         92  85 143
93         93  96 128
94         94  60 107
95         95 107 122
96         96 111 191
97         97 146 188
98         98 138 122
99         99 185 141
100       100 198 180
101       101 227 146
102       102 240 154
103       103 280 170
104       104 282 108
105       105 365 161
106       106 394 116
107       107 307 136
108       108 320 126
109       109 399 199
110       110 417 200
111       111 497 177
112       112 490  18
113       113 414  83
114       114 443 104
115       115 380  12
116       116 323  30
117       117 332  42
118       118 328  66
119       119 311  80
120       120 318  92
121       121 303  81
122       122 279  70
123       123 270  22
124       124 242  11
125       125 225  45
126       126 182  17
127       127 166  66
128       128 196  80
129       129 154  35
130       130 111  36
131       131 125  60
132       132 112  93
133       133  81  53
134       134  79  26
135       135  48  43
136       136  34  20
137       137  18  34
138       138  54  76
> # mengidentifikasi kelengkapan baris dari suatu data frame
> complete.cases(cav)
  [1] TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
 [28] TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
 [55] TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
 [82] TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
[109] TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
[136] TRUE TRUE TRUE
> cav.complete <- cav[complete.cases(cav), ]
> cav.complete
    rownames   x   y
```

1	1	498	475
2	2	474	498
3	3	473	449
4	4	450	459
5	5	420	447
6	6	401	430
7	7	384	433
8	8	369	426
9	9	359	435
10	10	334	483
11	11	272	424
12	12	294	445
13	13	274	493
14	14	257	463
15	15	225	488
16	16	165	498
17	17	174	477
18	18	155	480
19	19	137	445
20	20	111	443
21	21	133	486
22	22	60	462
23	23	42	470
24	24	38	416
25	25	98	414
26	26	89	488
27	27	86	395
28	28	77	366
29	29	67	334
30	30	47	325
31	31	100	341
32	32	103	360
33	33	116	372
34	34	124	347
35	35	144	367
36	36	180	390
37	37	188	393
38	38	173	367
39	39	196	349
40	40	148	334
41	41	209	315
42	42	228	316
43	43	240	366
44	44	286	332
45	45	269	313
46	46	305	387
47	47	319	366
48	48	328	389
49	49	335	401
50	50	367	399
51	51	350	376
52	52	359	366
53	53	326	343
54	54	338	320
55	55	367	320
56	56	386	341
57	57	407	406
58	58	450	401
59	59	433	350
60	60	485	266
61	61	442	295
62	62	418	271
63	63	431	245
64	64	460	214
65	65	371	230
66	66	358	278
67	67	358	299
68	68	336	259
69	69	292	281
70	70	273	292
71	71	244	293
72	72	258	284

```
73         73 233 299
74         74 212 297
75         75 225 273
76         76 213 259
77         77 266 228
78         78 185 286
79         79 136 222
80         80 171 216
81         81  85 209
82         82  57 218
83         83  29 284
84         84  22 266
85         85   9 237
86         86  16 108
87         87  16 126
88         88  25 146
89         89  58 181
90         90  38 173
91         91  76 158
92         92  85 143
93         93  96 128
94         94  60 107
95         95 107 122
96         96 111 191
97         97 146 188
98         98 138 122
99         99 185 141
100       100 198 180
101       101 227 146
102       102 240 154
103       103 280 170
104       104 282 108
105       105 365 161
106       106 394 116
107       107 307 136
108       108 320 126
109       109 399 199
110       110 417 200
111       111 497 177
112       112 490  18
113       113 414  83
114       114 443 104
115       115 380  12
116       116 323  30
117       117 332  42
118       118 328  66
119       119 311  80
120       120 318  92
121       121 303  81
122       122 279  70
123       123 270  22
124       124 242  11
125       125 225  45
126       126 182  17
127       127 166  66
128       128 196  80
129       129 154  35
130       130 111  36
131       131 125  60
132       132 112  93
133       133  81  53
134       134  79  26
135       135  48  43
136       136  34  20
137       137  18  34
138       138  54  76
> # Apakah ada hubungan linear antara posisi koordinat x dan y?
> attach(cav.complete)
> plot(x, y)
```

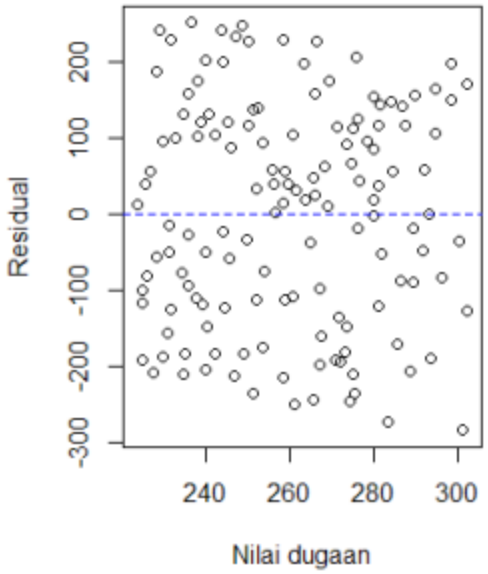


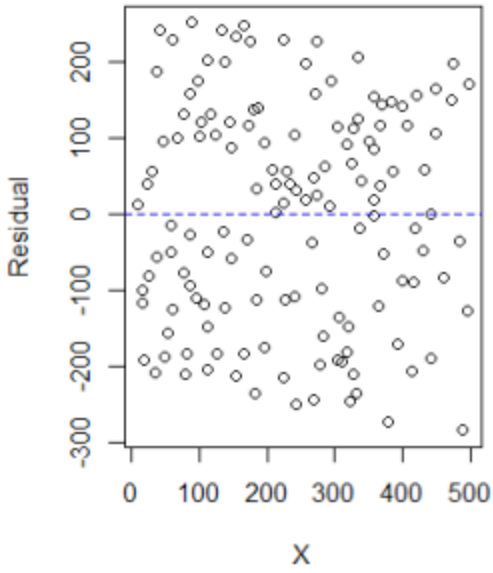

```
> sum.x <- sum(x)
> sum.x
[1] 32407
> sum.x2 <- sum(x^2)
> sum.x2
[1] 10146605
> sum.y <- sum(y)
> sum.y
[1] 35877
> sum.xy <- sum(x*y)
> sum.xy
[1] 8835451
> n <- nrow(cav.complete) #n=138
> n
[1] 138
> beta1.hat <- (n*sum.xy-sum.x*sum.y)/(n*sum.x2-(sum.x)^2)
> beta1.hat
[1] 0.1617812
> beta0.hat <- (sum.y-beta1.hat*sum.x)/n
> beta0.hat
[1] 221.9866
> # menggunakan fungsi lm di R
> lm(y~x)

Call:
lm(formula = y ~ x)

Coefficients:
(Intercept)            x
   221.9866       0.1618
> # prediksi
> plot(x,y)
> abline(lm(y~x))
```



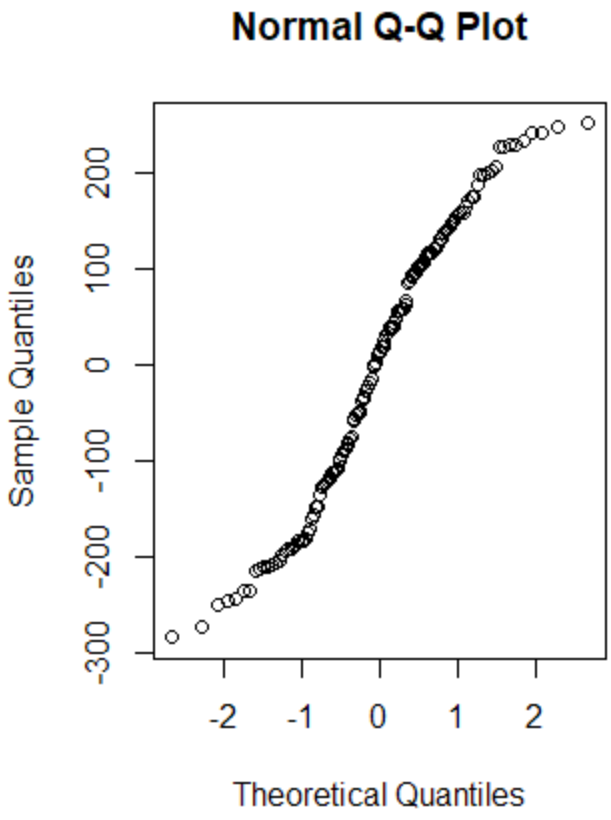

```
> # Sum of squares
> Sxx <- sum((x-mean(x))^2)
> Sxx
[1] 2536361
> Syy <- sum((y-mean(y))^2)
> Syy
[1] 2944897
> Sxy <- sum((x-mean(x))*(y-mean(y)))
> Sxy
[1] 410335.5
> SST <- Syy
> SST
[1] 2944897
> SSR <- beta1.hat*(Sxy)
> SSR
[1] 66384.56
> SSE <- SST-SSR
> SSE
[1] 2878512
> MSR <- SSR/1
> MSR
[1] 66384.56
> MSE <- SSE/(n-2)
> MSE
[1] 21165.53
> # F hitung atau F statistics
> F <- MSR/MSE
> F
[1] 3.136447
> p.value <- 1-pf(F,df1=1,df2=n-2)
> p.value
[1] 0.07880051
> R2 <- SSR/SST
```

```
> R2 # Koefisien determinasi R-kuadrat = 0.02254224 berarti 2% keragaman dalam data di
jelaskan oleh model regresi
[1] 0.02254224
> # Tabel ANOVA dengan program R
> mod.reg <- lm(y~x)
> mod.aov <- anova(mod.reg)
> mod.aov
Analysis of Variance Table

Response: y
           Df  Sum Sq Mean Sq F value Pr(>F)
x           1   66385   66385  3.1364 0.0788 .
Residuals 136 2878512   21166
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
> # F tabel
> qf(0.95,df1=1,df2=136)
[1] 3.910747
> # Uji hipotesis dan interval kepercayaan bagi beta1
> mod.reg <- lm(y~x)
> summary(mod.reg)

Call:
lm(formula = y ~ x)

Residuals:
    Min      1Q  Median      3Q     Max
-283.26 -119.35   14.09  118.04  251.62

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) 221.98665   24.77022   8.962 2.18e-15 ***
x             0.16178    0.09135   1.771   0.0788 .
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 145.5 on 136 degrees of freedom
Multiple R-squared:  0.02254,     Adjusted R-squared:  0.01536
F-statistic: 3.136 on 1 and 136 DF,  p-value: 0.0788

> confint(mod.reg)
                  2.5 %      97.5 %
(Intercept) 173.0020297 270.9712649
x            -0.0188692   0.3424316
> # koefisien korelasi sampel
> r <- Sxy/sqrt(Sxx*Syy)
> r
[1] 0.1501407
> cor(x,y)
[1] 0.1501407
> # koefisien korelasi
> cor.test(x,y)

        Pearson's product-moment correlation

data:  x and y
t = 1.771, df = 136, p-value = 0.0788
alternative hypothesis: true correlation is not equal to 0
95 percent confidence interval:
 -0.01740069  0.30948092
sample estimates:
      cor
0.1501407


> # Plot nilai dugaan vs residual & plot X vs residual
> par(mfrow=c(1,2))
> plot(fitted(mod.reg),resid(mod.reg),xlab="Nilai dugaan",ylab="Residual")
> abline(h=0,col="blue",lty=2)
> plot(x,resid(mod.reg),xlab="X",ylab="Residual")
> abline(h=0,col="blue",lty=2)
```






```
> # plot peluang normal
> qqnorm(resid(mod.reg))
```



- Hipotesis
  H0: Tidak ada hubungan linear yang signifikan antara gula darah dan kecepatan pemendekan ventrikel ($\beta 1 = 0$)
  H1: Ada hubungan linear yang signifikan antara gula darah dan kecepatan pemendekan ventrikel ($\beta 1 \neq 0$)

- Taraf signifikansi:
  $\alpha = 0.05$

- Statistik uji:
  $F = MSR/MSE$

- Kriteria keputusan:
  F 0.05(1,136) = 3.910747
  H0 ditolak jika F > 3.910747 atau H0 ditolak jika p-value < 0.05

- Hitungan:
  F = 3.136447 dan p-value = 0.0788

- Kesimpulan:
  Oleh karena F = 3.136447 < 3.910747 (atau p-value = 0.0788 > 0.05) maka H0 diterima. Jadi pada taraf signifikansi 0.05 dapat disimpulkan bahwa tidak ada hubungan linear yang signifikan antara posisi koordinat x dan koordinat y.