

R version 4.1.1 (2021-08-10) -- "Kick Things"
Copyright (C) 2021 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

Natural language support but running in an English locale

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[Previously saved workspace restored]

```
> (Name <- "Jack Rodoni")
[1] "Jack Rodoni"
> Sys.time()
[1] "2021-09-02 08:00:53 CDT"
> help.start()
starting httpd help server ... done
If nothing happens, you should open
'http://127.0.0.1:26416/doc/html/index.html' yourself
> x <- rnorm(50)
> y <- rnorm(x)
>

> plot(x,y)
> ls()
[1] "epsilon.t" "i"      "n"      "Name"    "phi1"    "phi2"
[7] "phi3"      "theta1"  "x"      "y"      "y.t"
> rm(x,y)
> x <- 1:20
> w <- 1+sqrt(x)/2
>
> dummy<-data.frame(x=x,y=x+rnorm(x)*w)
> dummy
      x      y
1  1 -1.5556463
2  2  0.7474796
3  3  3.8551137
4  4  3.4024859
5  5  5.4873333
6  6  7.8895954
7  7  7.0470016
8  8  8.2168419
9  9  7.2408786
10 10 14.5635809
```

```

11 11 9.4609847
12 12 7.7764854
13 13 14.5668886
14 14 13.0275124
15 15 15.3117681
16 16 20.0827514
17 17 15.2611602
18 18 19.1838916
19 19 16.9637023
20 20 21.8397421
>
> fm<-lm(y~x, data = dummy)
> summary(fm)

Call:
lm(formula = y ~ x, data = dummy)

Residuals:
    Min       1Q   Median       3Q      Max
-4.3229 -1.6125  0.1339  1.2581  4.5721

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) -0.54797     1.02334   -0.535    0.599
x             1.05395     0.08543   12.337 3.23e-10 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.203 on 18 degrees of freedom
Multiple R-squared:  0.8942,    Adjusted R-squared:  0.8884
F-statistic: 152.2 on 1 and 18 DF,  p-value: 3.225e-10

>
> fml<- lm(y~x, data = dummy, weights = 1/w^2)
> summary(fml)

Call:
lm(formula = y ~ x, data = dummy, weights = 1/w^2)

Weighted Residuals:
    Min       1Q   Median       3Q      Max
-1.59359 -0.60762  0.07635  0.46914  1.78716

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) -0.94720     0.77550   -1.221    0.238
x             1.08979     0.07907   13.782 5.27e-11 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.857 on 18 degrees of freedom
Multiple R-squared:  0.9134,    Adjusted R-squared:  0.9086
F-statistic: 189.9 on 1 and 18 DF,  p-value: 5.272e-11

```

```

>
> attach(dummy)
The following object is masked _by_ .GlobalEnv:

      x

>
> lrf <- lowess(x,y)
>
> plot(x,y)
>
> lines(x, lrf$y)
>
> abline(0,1,lty=3)
> abline(coef(fm))
> abline(coef(fm1), col = "red")
> detach()
> plot(fitted(fm), resid(fm), xlab = "Fitted values",
+      ylab = "Residuals", main = "Residuals vs Fitted")
> qqnorm(resid(fm), main = "Residuals Rankit Plot")
> rm(fm,fm1,lrf,x,dummy)
> filepath <- system.file("data", "morley.tab" , package="datasets")
> filepath
[1] "C:/PROGRA~1/R/R-41~1.1/library/datasets/data/morley.tab"
>
> file.show(filepath)
>
> mm <- read.table(filepath)
> mm
      Expt Run Speed
001     1   1   850
002     1   2   740
003     1   3   900
004     1   4  1070
005     1   5   930
006     1   6   850
007     1   7   950
008     1   8   980
009     1   9   980
010     1  10   880
011     1  11  1000
012     1  12   980
013     1  13   930
014     1  14   650
015     1  15   760
016     1  16   810
017     1  17  1000
018     1  18  1000
019     1  19   960
020     1  20   960
021     2   1   960
022     2   2   940
023     2   3   960
024     2   4   940

```

025	2	5	880
026	2	6	800
027	2	7	850
028	2	8	880
029	2	9	900
030	2	10	840
031	2	11	830
032	2	12	790
033	2	13	810
034	2	14	880
035	2	15	880
036	2	16	830
037	2	17	800
038	2	18	790
039	2	19	760
040	2	20	800
041	3	1	880
042	3	2	880
043	3	3	880
044	3	4	860
045	3	5	720
046	3	6	720
047	3	7	620
048	3	8	860
049	3	9	970
050	3	10	950
051	3	11	880
052	3	12	910
053	3	13	850
054	3	14	870
055	3	15	840
056	3	16	840
057	3	17	850
058	3	18	840
059	3	19	840
060	3	20	840
061	4	1	890
062	4	2	810
063	4	3	810
064	4	4	820
065	4	5	800
066	4	6	770
067	4	7	760
068	4	8	740
069	4	9	750
070	4	10	760
071	4	11	910
072	4	12	920
073	4	13	890
074	4	14	860
075	4	15	880
076	4	16	720
077	4	17	840
078	4	18	850

```

079      4  19   850
080      4  20   780
081      5   1   890
082      5   2   840
083      5   3   780
084      5   4   810
085      5   5   760
086      5   6   810
087      5   7   790
088      5   8   810
089      5   9   820
090      5  10   850
091      5  11   870
092      5  12   870
093      5  13   810
094      5  14   740
095      5  15   810
096      5  16   940
097      5  17   950
098      5  18   800
099      5  19   810
100      5  20   870
>
> mm$Expt <- factor(mm$Expt)
> mm$Run <- factor(mm$Run)
>
> attach(mm)
>
>
> plot(Expt, Speed, main="Speed of Light Data", xlab="Experiment No.")
> fm <- aov(Speed ~ Run + Expt, data=mm)
> summary(fm)
              Df Sum Sq Mean Sq F value    Pr(>F)
Run             19 113344     5965   1.105 0.36321
Expt             4  94514     23629   4.378 0.00307 **
Residuals       76 410166     5397
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

>
>
> fm0 <- update(fm, . ~ . - Run)
> anova(fm0, fm)
Analysis of Variance Table

Model 1: Speed ~ Expt
Model 2: Speed ~ Run + Expt
  Res.Df    RSS Df Sum of Sq    F Pr(>F)
1       95 523510
2       76 410166 19    113344 1.1053 0.3632
> detach()
>
> rm(fm, fm0)
>
> x <- seq(-pi, pi, len=50)

```

```

> y <- x
>
> f <- outer(x, y, function(x, y) cos(y)/(1 + x^2))
> oldpar <- par(no.readonly = TRUE)
> par(pty="s")
>
> contour(x, y, f)
> contour(x, y, f, nlevels=15, add=TRUE)
> fa <- (f-t(f))/2
> contour(x, y, fa, nlevels=15)
> par(oldpar)
> image(x, y, f)
>
> image(x, y, fa)
> objects(); rm(x, y, f, fa)
[1] "epsilon.t" "f" "fa" "filepath" "i" "mm"
[7] "n" "Name" "oldpar" "phi1" "phi2" "phi3"
[13] "theta1" "w" "x" "y" "y.t"
> th <- seq(-pi, pi, len=100)
> z <- exp(1i*th)
>
> par(pty="s")
> plot(z, type="l")
> w <- rnorm(100) + rnorm(100)*1i
> w <- ifelse(Mod(w) > 1, 1/w, w)
>
> plot(w, xlim=c(-1,1), ylim=c(-1,1), pch="+", xlab="x", ylab="y")
> lines(z)
> w <- sqrt(runif(100))*exp(2*pi*runif(100)*1i)
> plot(w, xlim=c(-1,1), ylim=c(-1,1), pch="+", xlab="x", ylab="y")
> lines(z)
>

```