Package ‘DiallelAnalysisR’

February 25, 2021

Type Package
Title Diallel Analysis with R
Version 0.4.0
Maintainer Muhammad Yaseen <myaseen208@gmail.com>
Description Performs Diallel Analysis with R using Griffing's and Hayman's approaches. Four different Methods (1: Method-I (Parents + F1's + reciprocals); 2: Method-II (Parents and one set of F1's); 3: Method-III (One set of F1's and reciprocals); 4: Method-IV (One set of F1's only)) and two Models (1: Fixed Effects Model; 2: Random Effects Model) can be applied using Griffing's approach.
Depends R (>= 3.5.0)
Copyright 2019-2020, UAF
License GPL-2 | GPL-3
Encoding UTF-8
LazyData true
RoxygenNote 7.1.1
https://CRAN.R-project.org/package=DiallelAnalysisR
https://myaseen208.github.io/DiallelAnalysisR/
BugReports https://github.com/myaseen208/DiallelAnalysisR/issues
Note Department of Mathematics and Statistics, University of Agriculture Faisalabad, Faisalabad-Pakistan.
Imports ggplot2, stats
Suggests knitr, rmarkdown, testthat
NeedsCompilation no
Author Muhammad Yaseen [aut, cre, cph]
<Kent M. Eskridge [ctb],
Pedro A. M. Barbosa [ctb]
Repository CRAN
Date/Publication 2021-02-25 10:40:07 UTC
R topics documented:

Griffing ................................................................. 2
GriffingData1 .......................................................... 6
GriffingData2 ........................................................... 7
GriffingData3 ........................................................... 8
GriffingData4 ........................................................... 9
Hayman ................................................................. 10
HaymanData ............................................................ 12
PartialDiallel ........................................................... 13
PartialDiallelData ...................................................... 14

Index 15

Griffing Diallel Analysis using Griffing Approach

Description
Griffing is used for performing Diallel Analysis using Griffing’s Approach.

Usage
Griffing(y, Rep, Cross1, Cross2, data, Method, Model)

Arguments

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>Numeric Response Vector</td>
</tr>
<tr>
<td>Rep</td>
<td>Replicate as factor</td>
</tr>
<tr>
<td>Cross1</td>
<td>Cross 1 as factor</td>
</tr>
<tr>
<td>Cross2</td>
<td>Cross 2 as factor</td>
</tr>
<tr>
<td>data</td>
<td>A data.frame</td>
</tr>
<tr>
<td>Method</td>
<td>Method for Diallel Analysis using Griffing’s approach. It can take 1, 2, 3, or 4 as argument depending on the method being used.</td>
</tr>
<tr>
<td></td>
<td>1. Method-I (Parents + F1’s + reciprocals);</td>
</tr>
<tr>
<td></td>
<td>2. Method-II (Parents and one set of F1’s);</td>
</tr>
<tr>
<td></td>
<td>3. Method-III (One set of F1’s and reciprocals);</td>
</tr>
<tr>
<td></td>
<td>4. Method-IV (One set of F1’s only).</td>
</tr>
<tr>
<td>Model</td>
<td>Model for Diallel Analysis using Griffing’s approach. It can take 1 or 2 as arguments depending on the model being used.</td>
</tr>
<tr>
<td></td>
<td>1. Fixed Effects Model;</td>
</tr>
<tr>
<td></td>
<td>2. Random Effects Model.</td>
</tr>
</tbody>
</table>

Details
Diallel Analysis using Griffing’s approach.
Value

Means Means
ANOVA Analysis of Variance (ANOVA) table
Genetic Components Genetic Components
Effects Effects of Crosses
StdErr Standard Errors of Crosses

Author(s)

Muhammad Yaseen (<myaseen208@gmail.com>)

References


See Also

Hayman, GriffingData1, GriffingData2, GriffingData3, GriffingData4

Examples

```r
#-------------------------------------------------------------
## Diallel Analysis with Griffing's Approach Method 1 & Model 1
#-------------------------------------------------------------
Griffing1Data1 <- Griffing(
  y = Yield,
  Rep = Rep,
  Cross1 = Cross1,
  Cross2 = Cross2,
  data = GriffingData1,
  Method = 1,
  Model = 1
)
names(Griffing1Data1)
Griffing1Data1
Griffing1Data1Means <- Griffing1Data1$Means
Griffing1Data1ANOVA <- Griffing1Data1$ANOVA
Griffing1Data1Genetic.Components <- Griffing1Data1$Genetic.Components
Griffing1Data1Effects <- Griffing1Data1$Effects
Griffing1Data1StdErr <- as.matrix(Griffing1Data1$StdErr)

#-------------------------------------------------------------
## Diallel Analysis with Griffing's Approach Method 1 & Model 2
#-------------------------------------------------------------
```
Griffing2Data1 <- Griffing(
  y = Yield
  , Rep = Rep
  , Cross1 = Cross1
  , Cross2 = Cross2
  , data = GriffingData1
  , Method = 1
  , Model = 2
)

names(Griffing2Data1)
Griffing2Data1
Griffing2Data1Means <- Griffing2Data1$Means
Griffing2Data1ANOVA <- Griffing2Data1$ANOVA
Griffing2Data1Genetic.Components <- Griffing2Data1$Genetic.Components

#--------------------------------------------------------------
## Diallel Analysis with Griffing's Approach Method 2 & Model 1
#--------------------------------------------------------------
Griffing1Data2 <- Griffing(
  y = Yield
  , Rep = Rep
  , Cross1 = Cross1
  , Cross2 = Cross2
  , data = GriffingData2
  , Method = 2
  , Model = 1
)

names(Griffing1Data2)
Griffing1Data2
Griffing1Data2Means <- Griffing1Data2$Means
Griffing1Data2ANOVA <- Griffing1Data2$ANOVA
Griffing1Data2Genetic.Components <- Griffing1Data2$Genetic.Components
Griffing1Data2Effects <- Griffing1Data2$Effects
Griffing1Data2StdErr <- as.matrix(Griffing1Data2$StdErr)

#--------------------------------------------------------------
## Diallel Analysis with Griffing's Approach Method 2 & Model 2
#--------------------------------------------------------------
Griffing2Data2 <- Griffing(
  y = Yield
  , Rep = Rep
  , Cross1 = Cross1
  , Cross2 = Cross2
  , data = GriffingData2
  , Method = 2
  , Model = 2
)

names(Griffing2Data2)
Griffing

Griffing2Data2
Griffing2Data2Means <- Griffing2Data2$Means
Griffing2Data2ANOVA <- Griffing2Data2$ANOVA
Griffing2Data2Genetic.Components <- Griffing2Data2$Genetic.Components

#--------------------------------------------------------------
## Diallel Analysis with Griffing's Approach Method 3 & Model 1
#--------------------------------------------------------------
Griffing1Data3 <- Griffing(
  y = Yield,
  Rep = Rep,
  Cross1 = Cross1,
  Cross2 = Cross2,
  data = GriffingData3,
  Method = 3,
  Model = 1
)
names(Griffing1Data3)
Griffing1Data3
Griffing1Data3Means <- Griffing1Data3$Means
Griffing1Data3ANOVA <- Griffing1Data3$ANOVA
Griffing1Data3Genetic.Components <- Griffing1Data3$Genetic.Components
Griffing1Data3Effects <- Griffing1Data3$Effects
Griffing1Data3StdErr <- as.matrix(Griffing1Data3$StdErr)

#--------------------------------------------------------------
## Diallel Analysis with Griffing's Approach Method 3 & Model 2
#--------------------------------------------------------------
Griffing2Data3 <- Griffing(
  y = Yield,
  Rep = Rep,
  Cross1 = Cross1,
  Cross2 = Cross2,
  data = GriffingData3,
  Method = 3,
  Model = 2
)
names(Griffing2Data3)
Griffing2Data3
Griffing2Data3Means <- Griffing2Data3$Means
Griffing2Data3ANOVA <- Griffing2Data3$ANOVA
Griffing2Data3Genetic.Components <- Griffing2Data3$Genetic.Components

#--------------------------------------------------------------
## Diallel Analysis with Griffing's Approach Method 4 & Model 1
#--------------------------------------------------------------
Griffing1Data4 <- Griffing(

GriffingData1

Data for Diallel Analysis using Griffing Approach Method 1

Description

Griffing is used for performing Diallel Analysis using Griffing’s Approach.

Usage

data(GriffingData1)

Format

A data.frame with 256 rows and 4 variables.
**GriffingData2**

**Details**
- Cross1 Cross 1
- Cross2 Cross 2
- Rep Replicate
- Yield Yield Response

**Author(s)**
Muhammad Yaseen (<myaseen208@gmail.com>)

**References**

**See Also**
Griffing, GriffingData2, GriffingData3, GriffingData4

**Examples**
```r
data(GriffingData1)
```

---

**GriffingData2  Data for Diallel Analysis using Griffing Approach Method 2**

**Description**
Griffing is used for performing Diallel Analysis using Griffing’s Approach.

**Usage**
data(GriffingData2)

**Format**
A data.frame with 144 rows and 4 variables.

**Details**
- Cross1 Cross 1
- Cross2 Cross 2
- Rep Replicate
- Yield Yield Response
Author(s)

Muhammad Yaseen (<myaseen208@gmail.com>)

References


See Also

Griffing, GriffingData1, GriffingData3, GriffingData4

Examples

data(GriffingData2)

---

### GriffingData3

*Data for Diallel Analysis using Griffing Approach Method 3*

Description

Griffing is used for performing Diallel Analysis using Griffing’s Approach.

Usage

data(GriffingData3)

Format

A data.frame with 224 rows and 4 variables.

Details

- Cross1 Cross 1
- Cross2 Cross 2
- Rep Replicate
- Yield Yield Response

Author(s)

Muhammad Yaseen (<myaseen208@gmail.com>)
References


See Also

Griffing, GriffingData1, GriffingData2, GriffingData4

Examples

```r
data(GriffingData3)
```

---

**GriffingData4**

*Data for Diallel Analysis using Griffing Approach Method 4*

Description

Griffing is used for performing Diallel Analysis using Griffing’s Approach.

Usage

```r
data(GriffingData4)
```

Format

A `data.frame` with 112 rows and 4 variables.

Details

- Cross1 Cross 1
- Cross2 Cross 2
- Rep Replicate
- Yield Yield Response

Author(s)

Muhammad Yaseen (<myaseen208@gmail.com>)

References


See Also

Griffing, GriffingData1, GriffingData2, GriffingData3

Examples

data(GriffingData4)

Hayman

Diallel Analysis using Hayman Approach

Description

Hayman is used for performing Diallel Analysis using Hayman's Approach.

Usage

Hayman(y, Rep, Cross1, Cross2, data)

Arguments

y Numeric Response Vector
Rep Replicate as factor
Cross1 Cross 1 as factor
Cross2 Cross 2 as factor
data A data.frame

Details

Diallel Analysis using Hayman's approach.

Value

Means Means
ANOVA Analysis of Variance (ANOVA) table
Genetic.Components Genetic Components
Effects Effects of Crosses
StdErr Standard Errors of Crosses

Author(s)

Muhammad Yaseen (<myaseen208@gmail.com>)
References


See Also

Griffing, HaymanData

Examples

```r
#------------------------------------------
## Diallel Analysis with Haymans's Approach
#------------------------------------------

Hayman1Data <- Hayman(
  y = Yield
, Rep = Rep
, Cross1 = Cross1
, Cross2 = Cross2
, data = HaymanData
)

names(Hayman1Data)

Hayman1DataMeans <- Hayman1Data$Means
Hayman1DataANOVA <- Hayman1Data$ANOVA
Hayman1DataWr.Vr.Table <- Hayman1Data$Wr.Vr.Table

Hayman1DataComponents.of.Variation <- Hayman1Data$Components.of.Variation
Hayman1DataOther.Parameters <- Hayman1Data$Other.Parameters
Hayman1DataFr <- Hayman1Data$Fr

#----------------
# Wr-Vr Graph
#----------------

VOLO <- Hayman1Data$VOLO
In.Value <- Hayman1Data$In.Value
a <- Hayman1Data$a
b <- Hayman1Data$b
Wr.Vr <- Hayman1Data$Wr.Vr.Table

library(ggplot2)
ggplot(data=data.frame(x=c(0, max(In.Value, Wr.Vr$Vr, Wr.Vr$Wr, Wr.Vr$Wrei))), aes(x)) +
  stat_function(fun=function(x) {sqrt(x*VOLO)}, color="blue") +
  geom_hline(yintercept = 0) +
```
geom_vline(xintercept = 0) +
geom_abline(intercept = a, slope = b) +
geom_abline(intercept = mean(Wr.Vr$Wr) - mean(Wr.Vr$Vr), slope = 1) +
geom_segment(aes(
  x = mean(Wr.Vr$Wr),
  y = min(0, mean(Wr.Vr$Wr)),
  xend = mean(Wr.Vr$Vr),
  yend = max(0, mean(Wr.Vr$Wr))
),
  color = "green"
) +
geom_segment(aes(
  x = min(0, mean(Wr.Vr$Vr)),
  y = mean(Wr.Vr$Wr),
  xend = max(0, mean(Wr.Vr$Vr)),
  yend = mean(Wr.Vr$Wr)
),
  color = "green"
) +
lims(x = c(min(0, Wr.Vr$Vr, Wr.Vr$Wrei), max(Wr.Vr$Vr, Wr.Vr$Wrei)),
y = c(min(0, Wr.Vr$Wr, Wr.Vr$Wrei), max(Wr.Vr$Wr, Wr.Vr$Wri)))
) +
labs(
  x = expression(V[r]),
  y = expression(W[r]),
  title = expression(paste(W[r]-V[r], " Graph"))
) +
theme_bw()

---

**HaymanData**

**Data for Diallel Analysis using Hayman’s Approach**

**Description**

Griffing is used for performing Diallel Analysis using Hayman’s Approach.

**Usage**

data(HaymanData)

**Format**

A `data.frame` with 256 rows and 4 variables.

**Details**

- Cross1 Cross 1
- Cross2 Cross 2
- Rep Replicate
- Yield Yield Response
PartialDiallel

Author(s)

Muhammad Yaseen (<myaseen208@gmail.com>)

References


Examples

data(HaymanData)

PartialDiallel Analysis for Partial Diallel

Description

Analysis of Partial Diallel

Usage

PartialDiallel(y, Rep, Cross1, Cross2, data)

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>Numeric Response Vector</td>
</tr>
<tr>
<td>Rep</td>
<td>Replicate as factor</td>
</tr>
<tr>
<td>Cross1</td>
<td>Cross 1 as factor</td>
</tr>
<tr>
<td>Cross2</td>
<td>Cross 2 as factor</td>
</tr>
<tr>
<td>data</td>
<td>A data.frame</td>
</tr>
</tbody>
</table>

Value

Means Means
ANOVA Analysis of Variance (ANOVA) table
Genetic.Components Genetic Components
General General
Specific Specific

Author(s)

1. Pedro A. M. Barbosa (<pedro.barbosa@usp.br>)
2. Muhammad Yaseen (<myaseen208@gmail.com>)
PartialDiallelData

See Also

PartialDiallelData, Griffing, Hayman, GriffingData1, GriffingData2, GriffingData3, GriffingData4

Examples

data(PartialDiallelData)
fm1 <- PartialDiallel(y = y, Rep = Rep, Cross1 = Cross1, Cross2 = Cross2, data = PartialDiallelData)

fm1

PartialDiallelData  Data for Partial Diallel Analysis

Description

Data for Partial Diallel Analysis

Usage

data(PartialDiallelData)

Details

- Cross1 Cross 1
- Cross2 Cross 2
- Rep Replicate
- Yield Yield Response

See Also

PartialDiallel, Griffing, Hayman, GriffingData1, GriffingData2, GriffingData3, GriffingData4

Examples

data(PartialDiallelData)
Index

* datasets
  GriffingData1, 6
  GriffingData2, 7
  GriffingData3, 8
  GriffingData4, 9
  HaymanData, 12
  PartialDiallelData, 14

Griffing, 2, 7—11, 14
GriffingData1, 3, 6, 8—10, 14
GriffingData2, 3, 7, 7, 9, 10, 14
GriffingData3, 3, 7, 8, 8, 10, 14
GriffingData4, 3, 7—9, 9, 14

Hayman, 3, 10, 14
HaymanData, 11, 12

PartialDiallel, 13, 14
PartialDiallelData, 14, 14