

# Package: DiallelAnalysisR (via r-universe)

September 13, 2024

**Type** Package

**Title** Diallel Analysis with R

**Version** 0.6.0

**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 (>= 4.1)

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**License** GPL-2 | GPL-3

**Encoding** UTF-8

**LazyData** true

**RoxygenNote** 7.3.2

**URL** <https://myaseen208.com/DiallelAnalysisR/>  
<https://CRAN.R-project.org/package=DiallelAnalysisR>

**BugReports** <https://github.com/myaseen208/DiallelAnalysisR/issues>

**Imports** ggplot2, stats

**Suggests** knitr, rmarkdown, testthat

**Note** 1. Asian Development Bank (ADB), Islamabad, Pakistan. 2. Benazir Income Support Programme (BISP), Islamabad, Pakistan. 3. Department of Mathematics and Statistics, University of Agriculture Faisalabad, Faisalabad-Pakistan.

**Repository** <https://myaseen208.r-universe.dev>

**RemoteUrl** <https://github.com/myaseen208/diallelanalysisr>

**RemoteRef** HEAD

**RemoteSha** e82cc3ec03181854e551d14d4b57c8d7b8171308

## Contents

Griffing	2
GriffingData1	6
GriffingData2	7
GriffingData3	8
GriffingData4	9
Hayman	10
HaymanData	12
PartialDiallel	13
PartialDiallelData	14
<b>Index</b>	<b>15</b>

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Griffing	<i>Diallel Analysis using Griffing Approach</i>
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### Description

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

### Usage

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

### Arguments

y	Numeric Response Vector
Rep	Replicate as factor
Cross1	Cross 1 as factor
Cross2	Cross 2 as factor
data	A data.frame
Method	Method for Diallel Analysis using Griffing's approach. It can take <b>1, 2, 3, or 4</b> as argument depending on the method being used. <ol style="list-style-type: none"> <li>1. Method-I (Parents + <math>F_1</math>'s + reciprocals);</li> <li>2. Method-II (Parents and one set of <math>F_1</math>'s);</li> <li>3. Method-III (One set of <math>F_1</math>'s and reciprocals);</li> <li>4. Method-IV (One set of <math>F_1</math>'s only).</li> </ol>
Model	Model for Diallel Analysis using Griffing's approach. It can take <b>1 or 2</b> as arguments depending on the model being used. <ol style="list-style-type: none"> <li>1. Fixed Effects Model;</li> <li>2. Random Effects Model.</li> </ol>

### 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 (&lt;myaseen208@gmail.com&gt;)

**References**

1. Griffing, B. (1956) Concept of General and Specific Combining Ability in relation to Diallel Crossing Systems. *Australian Journal of Biological Sciences*, **9(4)**, 463–493.
2. Singh, R. K. and Chaudhary, B. D. (2004) *Biometrical Methods in Quantitative Genetic Analysis*. New Delhi: Kalyani.

**See Also**

[Hayman](#) , [GriffingData1](#) , [GriffingData2](#) , [GriffingData3](#) , [GriffingData4](#)

**Examples**

```
#-----
## 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)

```

```

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(

```

```

      y      = Yield
    , Rep    = Rep
    , Cross1 = Cross1
    , Cross2 = Cross2
    , data   = GriffingData4
    , Method = 4
    , Model  = 1
  )
names(Griffing1Data4)
Griffing1Data4
Griffing1Data4Means <- Griffing1Data4$Means
Griffing1Data4ANOVA <- Griffing1Data4$ANOVA
Griffing1Data4Genetic.Components <- Griffing1Data4$Genetic.Components
Griffing1Data4Effects <- Griffing1Data4$Effects
Griffing1Data4StdErr <- as.matrix(Griffing1Data4$StdErr)

#-----
## Diallel Analysis with Griffing's Approach Method 4 & Model 2
#-----
Griffing2Data4 <-
  Griffing(
    y      = Yield
    , Rep   = Rep
    , Cross1 = Cross1
    , Cross2 = Cross2
    , data  = GriffingData4
    , Method = 4
    , Model  = 2
  )
names(Griffing2Data4)
Griffing2Data4
Griffing2Data4Means <- Griffing2Data4$Means
Griffing2Data4ANOVA <- Griffing2Data4$ANOVA
Griffing2Data4Genetic.Components <- Griffing2Data4$Genetic.Components

```

---

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.

**Details**

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

**Author(s)**

Muhammad Yaseen (<myaseen208@gmail.com>)

**References**

1. Griffing, B. (1956) Concept of General and Specific Combining Ability in relation to Diallel Crossing Systems. *Australian Journal of Biological Sciences*, **9(4)**, 463–493.
2. Singh, R. K. and Chaudhary, B. D. (2004) *Biometrical Methods in Quantitative Genetic Analysis*. New Delhi: Kalyani.

**See Also**

[Griffing](#), [GriffingData2](#), [GriffingData3](#), [GriffingData4](#)

**Examples**

```
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**

1. Griffing, B. (1956) Concept of General and Specific Combining Ability in relation to Diallel Crossing Systems. *Australian Journal of Biological Sciences*, **9(4)**, 463–493.
2. Singh, R. K. and Chaudhary, B. D. (2004) *Biometrical Methods in Quantitative Genetic Analysis*. New Delhi: Kalyani.

**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**

1. Griffing, B. (1956) Concept of General and Specific Combining Ability in relation to Diallel Crossing Systems. *Australian Journal of Biological Sciences*, **9(4)**, 463–493.
2. Singh, R. K. and Chaudhary, B. D. (2004) *Biometrical Methods in Quantitative Genetic Analysis*. New Delhi: Kalyani.

**See Also**

[Griffing](#), [GriffingData1](#), [GriffingData2](#), [GriffingData4](#)

**Examples**

```
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**

```
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**

1. Griffing, B. (1956) Concept of General and Specific Combining Ability in relation to Diallel Crossing Systems. *Australian Journal of Biological Sciences*, **9(4)**, 463–493.
2. Singh, R. K. and Chaudhary, B. D. (2004) *Biometrical Methods in Quantitative Genetic Analysis*. New Delhi: Kalyani.

**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 Haymans'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

1. Hayman, B. I. (1954 a) The Theory and Analysis of Diallel Crosses. *Genetics*, **39**, 789–809.
2. Hayman, B. I. (1954 b) The Analysis of Variance of Diallel Tables. *Biometrics*, **10**, 235–244.
3. Hayman, B. I. (1957) Interaction, Heterosis and Diallel Crosses. *Genetics*, **42**, 336–355.
4. Singh, R. K. and Chaudhary, B. D. (2004) *Biometrical Methods in Quantitative Genetic Analysis*. New Delhi: Kalyani.

## See Also

[Griffing](#), [HaymanData](#)

## Examples

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

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

Hayman1Data
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$Vr)
  , y    = min(0, mean(Wr.Vr$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

**Author(s)**

Muhammad Yaseen (<myaseen208@gmail.com>)

**References**

1. Griffing, B. (1956) Concept of General and Specific Combining Ability in relation to Diallel Crossing Systems. *Australian Journal of Biological Sciences*, **9(4)**, 463–493.
2. Test

**Examples**

```
data(HaymanData)
```

---

 PartialDiallel

*Analysis for Partial Diallel*


---

**Description**

Analysis of Partial Diallel

**Usage**

```
PartialDiallel(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

**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>)

**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](#)