# The **augmentedRCBD** package: A brief introduction

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2018-06-15

## Contents



### Overview

### Installation

The package can be installed using the following functions:

```
# Install from CRAN
install.packages('augmentedRCBD', dependencies=TRUE)

# Install development version from Github
devtools::install_github("aravind-j/augmentedRCBD")
```

Then the package can be loaded using the function

```
library(augmentedRCBD)
```

### Testing

```
# Example data
blk <- c(rep(1,7),rep(2,6),rep(3,7))
trt <- c(1, 2, 3, 4, 7, 11, 12, 1, 2, 3, 4, 5, 9, 1, 2, 3, 4, 8, 6, 10)
y1 <- c(92, 79, 87, 81, 96, 89, 82, 79, 81, 81, 91, 79, 78, 83, 77, 78, 78,
70, 75, 74)
y2 <- c(258, 224, 238, 278, 347, 300, 289, 260, 220, 237, 227, 281, 311, 250,
240, 268, 287, 226, 395, 450)
data <- data.frame(blk, trt, y1, y2)
# Convert block and treatment to factors
data$blk <- as.factor(data$blk)
data$trt <- as.factor(data$trt)
# Results for variable y1
out1 <- augmentedRCBD(data$blk, data$trt, data$y1, method = "lsd",
alpha = 0.05, group = TRUE, console = TRUE)
```

```
Augmented design details
========================

Number of blocks           "3"
Number of treatments       "12"
Number of check treatments "4"
Number of test treatments  "8"
Check treatments           "1, 2, 3, 4"

ANOVA, Treatment Adjusted
=========================
                                    Df Sum Sq Mean Sq F value Pr(>F)
Block (ignoring Treatments)          2  360.1  180.04   6.675 0.0298 *
Treatment (eliminating Blocks)      11  285.1   25.92   0.961 0.5499
  Treatment: Check                   3   52.9   17.64   0.654 0.6092
  Treatment: Test and Test vs. Check  8  232.2   29.02   1.076 0.4779
Residuals                            6  161.8   26.97
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

ANOVA, Block Adjusted
=====================
                             Df Sum Sq Mean Sq F value Pr(>F)
Treatment (ignoring Blocks)  11  575.7   52.33   1.940  0.215
  Treatment: Check            3   52.9   17.64   0.654  0.609
  Treatment: Test             7  505.9   72.27   2.679  0.125
  Treatment: Test vs. Check   1   16.9   16.87   0.626  0.459
Block (eliminating Treatments)  2   69.5   34.75   1.288  0.342
Residuals                     6  161.8   26.97

Treatment means
===============
   Treatment Block    Means       SE r Min Max Adjusted Means
1          1       84.66667 3.844188 3  79  92       84.66667
2         10     3 74.00000       NA 1  74  74       77.25000
3         11     1 89.00000       NA 1  89  89       86.50000
4         12     1 82.00000       NA 1  82  82       79.50000
5          2       79.00000 1.154701 3  77  81       79.00000
6          3       82.00000 2.645751 3  78  87       82.00000
7          4       83.33333 3.929942 3  78  91       83.33333
8          5     2 79.00000       NA 1  79  79       78.25000
9          6     3 75.00000       NA 1  75  75       78.25000
10         7     1 96.00000       NA 1  96  96       93.50000
11         8     3 70.00000       NA 1  70  70       73.25000
12         9     2 78.00000       NA 1  78  78       77.25000

Coefficient of variation
========================
6.372367

Overall adjusted mean
=====================
81.0625
```

```
Standard errors
===================
                                          Std. Error of Diff.  CD (5%)
Control Treatment Means                                4.240458 10.37603
Two Test Treatments (Same Block)                       7.344688 17.97180
Two Test Treatments (Different Blocks)                 8.211611 20.09309
A Test Treatment and a Control Treatment               6.360687 15.56404

Treatment groups
==================

Method : lsd

   Treatment Adjusted Means       SE df lower.CL  upper.CL Group
8          8       73.25000 5.609598  6 59.52381  86.97619    1
9          9       77.25000 5.609598  6 63.52381  90.97619    12
10        10       77.25000 5.609598  6 63.52381  90.97619    12
5          5       78.25000 5.609598  6 64.52381  91.97619    12
6          6       78.25000 5.609598  6 64.52381  91.97619    12
2          2       79.00000 2.998456  6 71.66304  86.33696    12
12        12       79.50000 5.609598  6 65.77381  93.22619    12
3          3       82.00000 2.998456  6 74.66304  89.33696    12
4          4       83.33333 2.998456  6 75.99637  90.67029    12
1          1       84.66667 2.998456  6 77.32971  92.00363    12
11        11       86.50000 5.609598  6 72.77381 100.22619    12
7          7       93.50000 5.609598  6 79.77381 107.22619     2
```

```r
# Results for variable y2
out2 <- augmentedRCBD(data$blk, data$trt, data$y1, method = "lsd",
alpha = 0.05, group = TRUE, console = TRUE)
```

```
Augmented design details
========================

Number of blocks           "3"
Number of treatments       "12"
Number of check treatments "4"
Number of test treatments  "8"
Check treatments           "1, 2, 3, 4"

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  Treatment: Check            3   52.9   17.64   0.654  0.609
  Treatment: Test             7  505.9   72.27   2.679  0.125
  Treatment: Test vs. Check   1   16.9   16.87   0.626  0.459
Block (eliminating Treatments)  2   69.5   34.75   1.288  0.342
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6          3       82.00000 2.645751 3  78  87       82.00000
7          4       83.33333 3.929942 3  78  91       83.33333
8          5     2 79.00000       NA 1  79  79       78.25000
9          6     3 75.00000       NA 1  75  75       78.25000
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6          6       78.25000 5.609598  6 64.52381  91.97619    12
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12        12       79.50000 5.609598  6 65.77381  93.22619    12
3          3       82.00000 2.998456  6 74.66304  89.33696    12
```

```
4          4       83.33333 2.998456  6 75.99637  90.67029    12
1          1       84.66667 2.998456  6 77.32971  92.00363    12
11        11       86.50000 5.609598  6 72.77381 100.22619    12
7          7       93.50000 5.609598  6 79.77381 107.22619     2
```

## Citing `augmentedRCBD`

```
Warning in citation("augmentedRCBD"): no date field in DESCRIPTION file of
package 'augmentedRCBD'
Warning in citation("augmentedRCBD"): could not determine year for
'augmentedRCBD' from package DESCRIPTION file

To cite package 'augmentedRCBD' in publications use:

  J. Aravind, Mukesh Sankar S., Dhammaprakash Pandhari Wankhede
  and Vikender Kaur (NA). augmentedRCBD: Analysis of Augmented
  Randomised Complete Block Design. R package version 0.0.0.9000.
  https://github.com/aravind-j/augmentedRCBD

A BibTeX entry for LaTeX users is

  @Manual{,
    title = {augmentedRCBD: Analysis of Augmented Randomised Complete Block Design},
    author = {{J. Aravind} and {Mukesh Sankar S.} and {Dhammaprakash Pandhari Wankhede} and {Vikender Ka
    note = {R package version 0.0.0.9000},
    url = {https://github.com/aravind-j/augmentedRCBD},
    year = {2018},
  }
```

## Session Info

```
sessionInfo()
```

```
R version 3.5.0 (2018-04-23)
Platform: x86_64-w64-mingw32/x64 (64-bit)
Running under: Windows >= 8 x64 (build 9200)

Matrix products: default

locale:
[1] LC_COLLATE=English_India.1252  LC_CTYPE=English_India.1252
[3] LC_MONETARY=English_India.1252 LC_NUMERIC=C
[5] LC_TIME=English_India.1252

attached base packages:
[1] stats     graphics  grDevices utils     datasets  methods   base

other attached packages:
[1] augmentedRCBD_0.0.0.9000

loaded via a namespace (and not attached):
 [1] Rcpp_0.12.16       mvtnorm_1.0-7      lattice_0.20-35
```

```
 [4] multcompView_0.1-7 zoo_1.8-1          assertthat_0.2.0
 [7] rprojroot_1.3-2    digest_0.6.15      R6_2.2.2
[10] plyr_1.8.4         backports_1.1.2    evaluate_0.10.1
[13] coda_0.19-1        ggplot2_2.2.1      pillar_1.2.2
[16] Rdpack_0.7-0       gdtools_0.1.7      rlang_0.2.0
[19] lazyeval_0.2.1     multcomp_1.4-8     uuid_0.1-2
[22] R.utils_2.6.0      R.oo_1.22.0        Matrix_1.2-14
[25] flextable_0.4.4    rmarkdown_1.9      devtools_1.13.5
[28] moments_0.14       splines_3.5.0      stringr_1.3.0
[31] munsell_0.4.3      compiler_3.5.0     pkgconfig_2.0.1
[34] base64enc_0.1-3    htmltools_0.3.6    tibble_1.4.2
[37] roxygen2_6.0.1     codetools_0.2-15   dplyr_0.7.4
[40] withr_2.1.2        MASS_7.3-49        R.methodsS3_1.7.1
[43] commonmark_1.5     grid_3.5.0         nlme_3.1-137
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[49] scales_0.5.0       bibtex_0.4.2       zip_1.0.0
[52] estimability_1.3   stringi_1.1.7      reshape2_1.4.3
[55] bindrcpp_0.2.2     xml2_1.2.0         sandwich_2.4-0
[58] TH.data_1.0-8      tools_3.5.0        glue_1.2.0
[61] officer_0.3.0      emmeans_1.1.3      survival_2.42-3
[64] yaml_2.1.18        colorspace_1.3-2   gbRd_0.4-11
[67] memoise_1.1.0      knitr_1.20         bindr_0.1.1
```

## References