

# Package: RSStest (via r-universe)

September 13, 2024

**Title** Testing the Equality of Two Means Using RSS and MRSS

**Version** 1.0

**Description** Testing the equality of two means using Ranked Set Sampling and Median Ranked Set Sampling are provided under normal distribution. Data generation functions are also given RSS and MRSS. Also, data generation functions are given under imperfect ranking data for Ranked Set Sampling and Median Ranked Set Sampling. Ozdemir Y.A., Ebegil M., & Gokpinar F. (2019), <[doi:10.1007/s40995-018-0558-0](https://doi.org/10.1007/s40995-018-0558-0)> Ozdemir Y.A., Ebegil M., & Gokpinar F. (2017), <[doi:10.1080/03610918.2016.1263736](https://doi.org/10.1080/03610918.2016.1263736)>.

**License** GPL-2

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CVT

*CVT Data*

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### Description

CVT Data

### Usage

`data(CVT)`

### Format

A dataframe with 167 rows 6 variables

**r1** otolith length

**otolith.width** otolith width

**otolith.weight** otolith weight

**fish.length** fish length

**fish.weight** fish weight

**age** age

**sex** sex

### Examples

`data("CVT")`

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`datagen_MRSS`*Median Ranked Set Sampling Data Generation*

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**Description**

This function generates random samples from normal population using Median ranked set sampling with mean  $\mu$  and standard deviation  $\sigma$  using cycle size  $r$  and set size  $m$ .

**Usage**

```
datagen_MRSS(mu, s, m, r)
```

**Arguments**

`mu` : Normal population mean  $\mu$   
`s` : Normal population standard deviation  $\sigma$   
`m` : Set size  
`r` : Cycle size

**Value**

A sample matrix with size `rxm` generated from normal distribution using Median ranked set sampling. Each row indicates a cycle.

**References**

MacEachern, S. N., Öztürk, Ö., Wolfe, A. D. (2002). A new ranked set sample estimator of variance. *Journal of the Royal Statistical Society: Series B.*, 64, Part 2 177–188.

Öztürk, Ö., Balakrishnan N (2009) Exact two-sample nonparametric test for quantile difference between two populations based on ranked set samples. *Ann Inst Stat Math* 61(1):235–249

Özdemir, Y. A., Ebegil, M., & Gökpinar, F. (2017). A test statistic based on ranked set sampling for two normal means. *Communications in Statistics-Simulation and Computation*, 46(10), 8077-8085.

Özdemir, Y. A., Ebegil, M., & Gökpinar, F. (2019). A test statistic for two normal means with median ranked set sampling. *Iranian Journal of Science and Technology, Transactions A: Science*, 43(3), 1109-1126.

**See Also**

[datagen\\_RSS](#), [teststat\\_RSS](#) [teststat\\_MRSS](#)

**Examples**

```
datagen_MRSS(0,1,2,3)
```

---

`datagen_RSS`*Ranked Set Sampling Data Generation*

---

**Description**

This function generates random samples from normal population using ranked set sampling with mean  $\mu$  and standard deviation  $\sigma$  using cycle size  $r$  and set size  $m$ .

**Usage**

```
datagen_RSS(mu, s, m, r)
```

**Arguments**

`mu` : Normal population mean  $\mu$   
`s` : Normal population standard deviation  $\sigma$   
`m` : Set size  
`r` : Cycle size

**Value**

A sample matrix with size  $r \times m$  generated from normal distribution using ranked set sampling. Each row indicates a cycle.

**References**

MacEachern, S. N., Öztürk, Ö., Wolfe, A. D. (2002). A new ranked set sample estimator of variance. *Journal of the Royal Statistical Society: Series B.*, 64, Part 2 177–188.

Öztürk, Ö., Balakrishnan N (2009) Exact two-sample nonparametric test for quantile difference between two populations based on ranked set samples. *Ann Inst Stat Math* 61(1):235–249

Özdemir, Y. A., Ebegil, M., & Gökpinar, F. (2017). A test statistic based on ranked set sampling for two normal means. *Communications in Statistics-Simulation and Computation*, 46(10), 8077-8085.

Özdemir, Y. A., Ebegil, M., & Gökpinar, F. (2019). A test statistic for two normal means with median ranked set sampling. *Iranian Journal of Science and Technology, Transactions A: Science*, 43(3), 1109-1126.

**See Also**

[datagen\\_MRSS](#), [teststat\\_RSS](#) [teststat\\_MRSS](#)

**Examples**

```
datagen_RSS(0,1,2,3)
```

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imperfectMRSS	<i>Imperfect Median Ranked Set Sampling Data Generation from Finite Population</i>
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### Description

This function chooses Median Ranked Set samples from specific finite population using auxiliary variable with cycle sizes  $r_1$  and  $r_2$  and set sizes  $m_1$  and  $m_2$ .

### Usage

```
imperfectMRSS(df, cat, catname, aux, var, r1, r2, m1, m2)
```

### Arguments

df	: dataframe of the finite population
cat	: the indicator variable that shows the group of units
catname	: the group names
aux	: auxiliary variable
var	: variable of interest
r1	: Cycle size of first group
r2	: Cycle size of second group
m1	: Set size of first group
m2	: Set size of second group

### Value

two median ranked set sample matrix with sizes  $r_1 \times m_1$  and  $r_2 \times m_2$  from finite population. Each row indicates a cycle.

### References

- MacEachern, S. N., Öztürk, Ö., Wolfe, A. D. (2002). A new ranked set sample estimator of variance. *Journal of the Royal Statistical Society: Series B.*, 64, Part 2 177–188.
- Öztürk, Ö., Balakrishnan N (2009) Exact two-sample nonparametric test for quantile difference between two populations based on ranked set samples. *Ann Inst Stat Math* 61(1):235–249
- Özdemir, Y. A., Ebegil, M., & Gökpınar, F. (2017). A test statistic based on ranked set sampling for two normal means. *Communications in Statistics-Simulation and Computation*, 46(10), 8077-8085.
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### See Also

[datagen\\_RSS](#), [teststat\\_RSS](#) [teststat\\_MRSS](#), [imperfectRSS](#)

**Examples**

```
data(otolith)
imperfectMRSS(otolith,"sex",c("F","M"),"fish.length","age",3,3,4,3)
```

---

imperfectRSS	<i>Imperfect Ranked Set Sampling Data Generation from Finite Population</i>
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**Description**

This function chooses Ranked Set samples from specific finite population using auxiliary variable with cycle sizes  $r_1$  and  $r_2$  and set sizes  $m_1$  and  $m_2$ .

**Usage**

```
imperfectRSS(df, cat, catname, aux, var, r1, r2, m1, m2)
```

**Arguments**

df	: dataframe of the finite population
cat	: the indicator variable that shows the group of units
catname	: the group names
aux	: auxiliary variable
var	: variable of interest
r1	: Cycle size of first group
r2	: Cycle size of second group
m1	: Set size of first group
m2	: Set size of second group

**Value**

two ranked set sample matrix with sizes  $r_1 \times m_1$  and  $r_2 \times m_2$  from finite population. Each row indicates a cycle.

**References**

- MacEachern, S. N., Öztürk, Ö., Wolfe, A. D. (2002). A new ranked set sample estimator of variance. *Journal of the Royal Statistical Society: Series B.*, 64, Part 2 177–188.
- Öztürk, Ö., Balakrishnan N (2009) Exact two-sample nonparametric test for quantile difference between two populations based on ranked set samples. *Ann Inst Stat Math* 61(1):235–249
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**See Also**

[datagen\\_RSS](#), [teststat\\_RSS](#) [teststat\\_MRSS](#), [imperfectMRSS](#)

**Examples**

```
data(otolith)
imperfectRSS(otolith,"sex",c("F","M"),"fish.length","age",3,3,4,3)
```

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otolith

*Otolith Data*

---

**Description**

The data related to otolith bone of fishes was collected from Elaziğ Keban Dam Lake (November 2011-December 2012), which was a part of the data by given Doğan and Şen(2017). The data containing otolith length, otolith width, otolith weight, fish length, fish width, age and sex.

**Usage**

```
data(otolith)
```

**Format**

A dataframe with 167 rows 6 variables

**otolith.length** otolith length

**otolith.width** otolith width

**otolith.weight** otolith weight

**fish.length** fish length

**fish.weight** fish weight

**age** age

**sex** sex

**Source**

Doğan Y. Şen D., Otolith Biometry-Fish Lenth Relationship in Capoeta trutta Inhabiting Keban Dam Lake

**Examples**

```
data("otolith")
```

---

teststat\_MRSS

*Median Ranked Set Sampling Test*


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### Description

This function tests for the difference of two population means using ranked set sampling given in Özdemir, Ebegil and Gökpınar (2019).

### Usage

```
teststat_MRSS(
  x1,
  x2,
  alpha = 0.05,
  alternative = "two-tailed",
  tn = 2000,
  table = TRUE
)
```

### Arguments

x1	A (non-empty) numeric matrix (m1xr1) of median ranked set sample for Group 1 with set size m1 and cycle size r1.
x2	A (non-empty) numeric matrix (m2xr2) of median ranked set sample for Group 2 with set size m2 and cycle size r2.
alpha	A scalar value of the significance level for hypothesis testing used in the table. Default is 0.05.
alternative	A character string specifying the alternative hypothesis, must be one of "two-sided", "right" or "left". Can be abbreviated. Default is "two-sided".
tn	A scalar value of the number of repetitions of Monte Carlo simulation. Default is 2000.
table	A logical value that shows table gives the results of the hypothesis test are printed out. Default is TRUE.

### Value

If table is TRUE the hypothesis test results table includes sample sizes, test statistics, p values and test results are printed out.

### References

- MacEachern, S. N., Öztürk, Ö., Wolfe, A. D. (2002). A new ranked set sample estimator of variance. *Journal of the Royal Statistical Society: Series B.*, 64, Part 2 177–188.
- Öztürk, Ö., Balakrishnan N (2009) Exact two-sample nonparametric test for quantile difference between two populations based on ranked set samples. *Ann Inst Stat Math* 61(1):235–249



Özdemir, Y. A., Ebegil, M., & Gökpinar, F. (2017). A test statistic based on ranked set sampling for two normal means. *Communications in Statistics-Simulation and Computation*, 46(10), 8077-8085.

Özdemir, Y. A., Ebegil, M., & Gökpinar, F. (2019). A test statistic for two normal means with median ranked set sampling. *Iranian Journal of Science and Technology, Transactions A: Science*, 43(3), 1109-1126.

### See Also

[datagen\\_MRSS](#), [datagen\\_RSS](#), [teststat\\_RSS](#)

### Examples

```
x1=matrix(c(1,2.3, 3.4,4.5,5.6,4 ),nrow=3)
x2=matrix(c(2,3.2, 4.2,6.5,4.6,6 ),nrow=3)
teststat_MRSS(x1,x2,tn=1000)
```

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teststat_RSS	<i>Ranked Set Sampling Test</i>
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### Description

This function tests for the difference of two population means using ranked set sampling given in Özdemir, Ebegil and Gökpinar (2017).

### Usage

```
teststat_RSS(x1, x2, alpha = 0.05, alternative = "two-tailed", table = TRUE)
```

### Arguments

x1	A (non-empty) numeric matrix (m1xr1) of ranked set sample for Group 1 with set size m1 and cycle size r1.
x2	A (non-empty) numeric matrix (m2xr2) of ranked set sample for Group 2 with set size m2 and cycle size r2.
alpha	A scalar value of the significance level for hypothesis testing used in the table. Default is 0.05.
alternative	A character string specifying the alternative hypothesis, must be one of "two-sided", "right" or "left". Can be abbreviated. Default is "two-sided".
table	A logical value that shows table gives the results of the hypothesis test are printed out. Default is TRUE.

### Value

If table is TRUE the hypothesis test results table includes sample sizes, test statistics, critical values and test results are printed out.

## References

MacEachern, S. N., Öztürk, Ö., Wolfe, A. D. (2002). A new ranked set sample estimator of variance. *Journal of the Royal Statistical Society: Series B.*, 64, Part 2 177–188.

Öztürk, Ö., Balakrishnan N (2009) Exact two-sample nonparametric test for quantile difference between two populations based on ranked set samples. *Ann Inst Stat Math* 61(1):235–249

Özdemir, Y. A., Ebegil, M., & Gökpınar, F. (2017). A test statistic based on ranked set sampling for two normal means. *Communications in Statistics-Simulation and Computation*, 46(10), 8077-8085.

Özdemir, Y. A., Ebegil, M., & Gökpınar, F. (2019). A test statistic for two normal means with median ranked set sampling. *Iranian Journal of Science and Technology, Transactions A: Science*, 43(3), 1109-1126.

@seealso [datagen\\_MRSS](#), [datagen\\_RSS](#), [teststat\\_MRSS](#)

## Examples

```
x1=matrix(c(1,2.3, 3.4,4.5,5.6,4 ),nrow=3)
x2=matrix(c(2,3.2, 4.2,6.5,4.6,6 ),nrow=3)
teststat_RSS(x1,x2)
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