

# Package ‘lm.beta’

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**Type** Package

**Title** Add Standardized Regression Coefficients to Linear-Model-Objects

**Version** 1.7-3

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**Description** Adds standardized regression coefficients to objects created by 'lm'. Also extends the S3 methods 'print', 'summary' and 'coef' with additional boolean argument 'standardized' and provides 'xtable'-support.

**License** GPL (>= 3)

**NeedsCompilation** no

**Repository** CRAN

**Imports** xtable

**Suggests** knitr

**VignetteBuilder** knitr

**Author** Stefan Behrendt [aut, cre]

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lm.beta-package

*Add Standardized Regression Coefficients to lm-Objects*

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## Description

Adds standardized regression coefficients to objects created by `lm`.

Also extends the S3 methods `print`, `summary` and `coef` with additional boolean argument `standardized` and provides `xtable`-support.

Please regard:

Package `lm.beta` works in the way of common statistical softwares like SPSS by standardizing the coefficients after estimating them using the standard deviations or similar measures of the used variables. So there are unstandardized and standardized coefficients available simultaneously.

Standardizing before estimating is not (yet) available in this package, but by using the command `scale` you can do this by using basic commands. Hereby please regard that the option `center` influences the way of interpretation of the intercept.

Package `lm.beta` standardizes all coefficients disregarding the use in interpretation. In this version, all types of scales of the variables (metrical, categorical, ...), all types of contrasts, interaction effects and additional terms on both sides of the formula can be handled if `lm` can handle them. The sensitive use in interpretation has to be regarded by the user.

## Details

Package: `lm.beta`  
Type: `Package`  
Version: `1.7-2`  
Date: `2023-03-12`  
License: `GPL(>=3)`

## Author(s)

Stefan Behrendt <r@behrendt-stefan.de>

## References

Urban, D., Mayerl, J., Sackmann, R. (Hrsg.) *Regressionsanalyse : Theorie, Technik und Anwendung*, VS-Verlag, 4. Aufl.

Vittinghoff, E. et al (2005) *Regression methods in biostatistics: Linear, logistic, survival, and repeated measures models*, Springer, p 75

## See Also

[lm.beta](#), [lm](#)

**Examples**

```
## Taken from lm help
##
## Annette Dobson (1990) "An Introduction to Generalized Linear Models".
## Page 9: Plant Weight Data.
ctl <- c(4.17,5.58,5.18,6.11,4.50,4.61,5.17,4.53,5.33,5.14)
trt <- c(4.81,4.17,4.41,3.59,5.87,3.83,6.03,4.89,4.32,4.69)
group <- gl(2, 10, 20, labels = c("Ctl","Trt"))
weight <- c(ctl, trt)
lm.D9 <- lm(weight ~ group)

# standardize
lm.D9.beta <- lm.beta(lm.D9)
print(lm.D9.beta)
summary(lm.D9.beta)
coef(lm.D9.beta)
xtable::xtable(lm.D9.beta)
```

coef.lm.beta

*Print Coefficients of Standardized Linear-Model-Object***Description**

S3-method coef for object lm.beta.

**Usage**

```
## S3 method for class 'lm.beta'
coef(object, standardized = TRUE, ...)
```

**Arguments**

object	An R object of class lm.beta
standardized	Logical. Should the standardized values be returned?
...	additional arguments. (Currently ignored.)

**Details**

If standardized=FALSE, the unstandardized regression coefficients are printed like if calling standard coef.lm-method, else (the standard value) the standardized regression coefficients are printed.

**Value**

named numeric Vector of (un)standardized regression coefficients.

**Author(s)**

Stefan Behrendt, <r@behrendt-stefan.de>

**See Also**

[lm.beta](#) for creating the `lm.beta`-object.

**Examples**

```
## Taken from lm help
##
## Annette Dobson (1990) "An Introduction to Generalized Linear Models".
## Page 9: Plant Weight Data.
ctl <- c(4.17,5.58,5.18,6.11,4.50,4.61,5.17,4.53,5.33,5.14)
trt <- c(4.81,4.17,4.41,3.59,5.87,3.83,6.03,4.89,4.32,4.69)
group <- gl(2, 10, 20, labels = c("Ctl","Trt"))
weight <- c(ctl, trt)
lm.D9 <- lm(weight ~ group)

# standardize
lm.D9.beta <- lm.beta(lm.D9)
coef(lm.D9.beta)
coef(lm.D9.beta, standardized=FALSE)
```

---

lm.beta

*Add Standardized Regression Coefficients to Linear-Model-Objects*

---

**Description**

Adds standardized regression coefficients to objects created by `lm`.

**Usage**

```
lm.beta(object, complete.standardization = FALSE)
```

**Arguments**

`object`            An R object of type `lm`  
`complete.standardization`  
                   Logical. (See Details.)

**Details**

Calculates the standardized regression coefficients by common method used for example in SPSS. For translating the formula, functions `model.matrix` (for the right-hand side) and `model.frame` (for the left-hand side) are used. Additionally the case weights are regarded. So all options saved in the `lm`-object are supported.

In the case of models with intercept, the standardization results in the same estimates as `lm(..., data = scale(data))`.

In the case of models without intercept, there are two different types of standardization available. (1) Complete standardization (`complete.standardization = TRUE`) results in the same estimates

as `lm(..., data = scale(data))` and therefore results in the same estimates as the same model with intercept. (2) Incomplete standardization (`complete.standardization = FALSE`, the standard value) results in the same estimates as `lm(..., data = scale(data, center = FALSE))`. This estimation is implemented in IBM SPSS Statistics. For a theoretical justification see *Eisenhauer 2003*.

Please regard:

Package `lm.beta` standardizes the coefficients after estimating them using the standard deviations or similar measures of the used variables. So there are unstandardized and standardized coefficients available simultaneously.

Standardizing before estimating is not (yet) available in this package, but by using the function `scale` you can do this by using basic commands. Hereby please regard that the option `center` influences the way of interpretation of the intercept.

Package `lm.beta` standardizes all coefficients disregarding the use in interpretation. In this version, all types of scales of the variables (metrical, categorical, ...), all types of contrasts, interaction effects and additional terms on both sides of the formula can be handled if `lm` can handle them. The sensitive use in interpretation has to be regarded by the user.

## Value

A list of class `lm.beta` like a `lm`-object extended by

- **standardized.coefficients** named vector of the standardized coefficients.

## Note

Some S3 methods, where standardized coefficients mind, are extended, the others work unchanged.

## Author(s)

Stefan Behrendt, <r@behrendt-stefan.de>

## References

Eisenhauer, J.G. (2003). Regression through the Origin. In *Teaching Statistics*, 25(3).

Urban, D., Mayerl, J., Sackmann, R. (Hrsg.) *Regressionsanalyse : Theorie, Technik und Anwendung*. VS-Verlag, 4th ed.

Vittinghoff, E. et al (2005) *Regression methods in biostatistics: Linear, logistic, survival, and repeated measures models*, Springer, p 75

## See Also

`lm` for creating the demanded object and `print.lm.beta`, `summary.lm.beta` and `coef.lm.beta` as well as `xtable.lm.beta` for extended S3-methods.

**Examples**

```
## Taken from lm help
##
## Annette Dobson (1990) "An Introduction to Generalized Linear Models".
## Page 9: Plant Weight Data.
ctl <- c(4.17,5.58,5.18,6.11,4.50,4.61,5.17,4.53,5.33,5.14)
trt <- c(4.81,4.17,4.41,3.59,5.87,3.83,6.03,4.89,4.32,4.69)
group <- gl(2, 10, 20, labels = c("Ctl","Trt"))
weight <- c(ctl, trt)
lm.D9 <- lm(weight ~ group)

# standardize
lm.D9.beta <- lm.beta(lm.D9)
print(lm.D9.beta)
summary(lm.D9.beta)
coef(lm.D9.beta)
xtable::xtable(lm.D9.beta)
```

---

print.lm.beta

*Print Standardized Linear-Model-Object*


---

**Description**

S3-method print for object lm.beta.

**Usage**

```
## S3 method for class 'lm.beta'
print(x, standardized = TRUE, ...)
```

**Arguments**

x	An R object of class lm.beta
standardized	Logical. Should the standardized values be printed?
...	Additional arguments to pass to print.lm

**Details**

If standardized=FALSE, the standard print.lm-method is called, else (the standard value) the regression coefficients are replaced by the standardized ones.

The additional arguments are in case of standardized=FALSE passed to print.lm, else they are passed to print for classes call and vector.

**Value**

Original object.

**Author(s)**

Stefan Behrendt, <r@behrendt-stefan.de>

**See Also**

[lm.beta](#) for creating the lm.beta-object.

**Examples**

```
## Taken from lm help
##
## Annette Dobson (1990) "An Introduction to Generalized Linear Models".
## Page 9: Plant Weight Data.
ctl <- c(4.17,5.58,5.18,6.11,4.50,4.61,5.17,4.53,5.33,5.14)
trt <- c(4.81,4.17,4.41,3.59,5.87,3.83,6.03,4.89,4.32,4.69)
group <- gl(2, 10, 20, labels = c("Ctl","Trt"))
weight <- c(ctl, trt)
lm.D9 <- lm(weight ~ group)

# standardize
lm.D9.beta <- lm.beta(lm.D9)
print(lm.D9.beta)
print(lm.D9.beta,standardized=FALSE)
```

---

summary.lm.beta

*Summarize Standardized Linear-Model-Object*

---

**Description**

S3-method summary for object lm.beta.

**Usage**

```
## S3 method for class 'lm.beta'
summary(object, standardized = TRUE, ...)
```

**Arguments**

object	An R object of class lm.beta
standardized	Logical. Should the standardized values be integrated?
...	Additional arguments to pass to summary.lm

**Details**

If standardized=FALSE, the standard summary.lm-method is called, else (the standard value) the standardized regression coefficients are added into the coefficient table.

The additional arguments are passed to summary.lm.

**Value**

Adapted [summary.lm](#)-object, in case of `standardized=TRUE` with additional class `summary.lm.beta`.

**Author(s)**

Stefan Behrendt, <r@behrendt-stefan.de>

**See Also**

[lm.beta](#) for creating the `lm.beta`-object.

**Examples**

```
## Taken from lm help
##
## Annette Dobson (1990) "An Introduction to Generalized Linear Models".
## Page 9: Plant Weight Data.
ctl <- c(4.17,5.58,5.18,6.11,4.50,4.61,5.17,4.53,5.33,5.14)
trt <- c(4.81,4.17,4.41,3.59,5.87,3.83,6.03,4.89,4.32,4.69)
group <- gl(2, 10, 20, labels = c("Ctl","Trt"))
weight <- c(ctl, trt)
lm.D9 <- lm(weight ~ group)

# standardize
lm.D9.beta <- lm.beta(lm.D9)
summary(lm.D9.beta)
summary(lm.D9.beta,standardized=FALSE)
```

---

xtable.lm.beta	<i>Coerce Coefficient Table of Standardized Linear-Model-Object to LaTeX- and HTML-Tables</i>
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**Description**

S3-method `xtable` for object `lm.beta` and `summary.lm.beta`.

**Usage**

```
## S3 method for class 'lm.beta'
xtable(x, caption = NULL, label = NULL, align = NULL,
       digits = NULL, display = NULL, auto = FALSE, ...)
## S3 method for class 'summary.lm.beta'
xtable(x, caption = NULL, label = NULL, align = NULL,
       digits = NULL, display = NULL, auto = FALSE, ...)
```

**Arguments**

x	An R object of class 'lm.beta' or 'summary.lm.beta'.
caption	see <a href="#">xtable</a>
label	see <a href="#">xtable</a>
align	see <a href="#">xtable</a>
digits	see <a href="#">xtable</a>
display	see <a href="#">xtable</a>
auto	see <a href="#">xtable</a>
...	Additional arguments. (Currently ignored.)

**Details**

see [xtable](#)

**Value**

see [xtable](#)

**Author(s)**

Stefan Behrendt, <r@behrendt-stefan.de>

**See Also**

[lm.beta](#) for creating the lm.beta-object and [xtable](#) for creating the tables.

**Examples**

```
## Taken from lm help
##
## Annette Dobson (1990) "An Introduction to Generalized Linear Models".
## Page 9: Plant Weight Data.
ctl <- c(4.17,5.58,5.18,6.11,4.50,4.61,5.17,4.53,5.33,5.14)
trt <- c(4.81,4.17,4.41,3.59,5.87,3.83,6.03,4.89,4.32,4.69)
group <- gl(2, 10, 20, labels = c("Ctl","Trt"))
weight <- c(ctl, trt)
lm.D9 <- lm(weight ~ group)

# standardize
lm.D9.beta <- lm.beta(lm.D9)
xtable::xtable(lm.D9.beta)
```

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