

# Package ‘dfadjust’

December 16, 2019

**Title** Degrees of Freedom Adjustment for Robust Standard Errors

**Version** 1.0.1

**Description** Computes small-sample degrees of freedom adjustment for heteroskedasticity robust standard errors, and for clustered standard errors in linear regression. See Imbens and Kolesár (2016) <doi:10.1162/REST\_a\_00552> for a discussion of these adjustments.

**Depends** R (>= 3.5.0)

**License** MIT + file LICENSE

**Encoding** UTF-8

**LazyData** true

**Suggests** testthat (>= 2.1.0), sandwich, knitr, rmarkdown, spelling, formatR

**RoxygenNote** 7.0.2

**URL** <https://github.com/kolesarm/Robust-Small-Sample-Standard-Errors>

**BugReports** <https://github.com/kolesarm/Robust-Small-Sample-Standard-Errors/issues>

**Language** en-US

**VignetteBuilder** knitr

**NeedsCompilation** no

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**Repository** CRAN

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dfadjustSE

*Standard Errors with adjusted degrees of freedom***Description**

Standard Errors with adjusted degrees of freedom

**Usage**

```
dfadjustSE(
  model,
  clustervar = NULL,
  ell = NULL,
  IK = TRUE,
  tol = 1e-09,
  rho0 = FALSE
)
```

**Arguments**

model	Fitted model returned by the <code>lm</code> function
clustervar	Factor variable that defines clusters. If <code>NULL</code> (or not supplied), the command computes heteroscedasticity-robust standard errors, rather than cluster-robust standard errors.
ell	A vector of the same length as the dimension of covariates, specifying which linear combination $\ell' \beta$ of coefficients $\beta$ to compute. If <code>NULL</code> , compute standard errors for each regressor coefficient.
IK	Only relevant for cluster-robust standard errors. Specifies whether to compute the degrees-of-freedom adjustment using the Imbens-Kolesár (2016) method (if <code>TRUE</code> ), or the Bell-McCaffrey (2002) method (if <code>FALSE</code> ).
tol	Numerical tolerance for determining whether an eigenvalue equals zero.
rho0	Impose positive $\rho$ when estimating the Moulton (1986) model when implementing the IK method?

**Value**

Returns a list with the following components

**vcov** Variance-covariance matrix estimator. For independent errors, it corresponds to the HC2 estimator (see MacKinnon and White, 1985 and the reference manual for the `sandwich` package). For clustered errors, it corresponds to a version the generalization of the HC2 estimator, called LZ2 in Imbens and Kolesár.

**coefficients** Matrix of estimated coefficients, along with HC1, and HC2 standard errors, Adjusted standard errors, and effective degrees of freedom. Adjusted standard error is HC2 standard error multiplied by  $qt(0.975, df=dof)/qnorm(0.975)$  so that one can construct 95% confidence intervals by adding and subtracting 1.96 times the adjusted standard error.

**rho, sig** Estimates of  $\rho$  and  $\sigma$  of the Moulton (1986) model for the regression errors. Only computed if IK method is used

## References

Robert M. Bell and Daniel F. McCaffrey. *Bias reduction in standard errors for linear regression with multi-stage samples*. *Survey Methodology*, 28(2):169–181, 2002.

Guido W. Imbens and Michal Kolesár. *Robust standard errors in small samples: Some practical advice*. *Review of Economics and Statistics*, 98(4):701–712, October 2016.

Brent R. Moulton. *Random group effects and the precision of regression estimates*. *Journal of Econometrics*, 32(3):385–397, 1986.

## Examples

```
## No clustering:
set.seed(42)
x <- sin(1:100)
y <- rnorm(100)
fm <- lm(y ~ x + I(x^2))
dfadjustSE(fm)
## Clustering, with 5 clusters
clustervar <- as.factor(c(rep(1, 40), rep(1, 20),
                        rep(2, 20), rep(3, 10), rep(4, 10)))
dfadjustSE(fm, clustervar)
```

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