

Package ‘dfadjust’

October 4, 2023

Title Degrees of Freedom Adjustment for Robust Standard Errors

Version 1.0.5

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>](https://doi.org/10.1162/REST_a_00552) for a discussion of these adjustments.

Depends R ($\geq 3.6.0$)

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Encoding UTF-8

Suggests testthat ($\geq 2.1.0$),
sandwich,
knitr,
rmarkdown,
spelling,
formatR

Roxygen list(markdown = TRUE)

RoxygenNote 7.2.3

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

R topics documented:

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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

<code>model</code>	Fitted model returned by the <code>lm</code> function
<code>clustervar</code>	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.
<code>ell</code>	A vector of the same length as the dimension of covariates, specifying which linear combination $\ell' \beta$ of coefficients β to compute. If <code>NULL</code> , compute standard errors for each regressor coefficient.
<code>IK</code>	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>).
<code>tol</code>	Numerical tolerance for determining whether an eigenvalue equals zero.
<code>rho0</code>	Impose positive ρ 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, or 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 ρ and σ 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, December 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. doi:[10.1162/REST_a_00552](https://doi.org/10.1162/REST_a_00552)

James G. MacKinnon and Halbert White. *Some Heteroskedasticity-Consistent Covariance Matrix Estimators with Improved Finite Sample Properties*. *Journal of Econometrics*, (29)3:305–325, September 1985. doi:[10.1016/03044076\(85\)901587](https://doi.org/10.1016/03044076(85)901587)

Brent R. Moulton. *Random group effects and the precision of regression estimates*. *Journal of Econometrics*, 32(3):385–397, August 1986. doi:[10.1016/03044076\(86\)900217](https://doi.org/10.1016/03044076(86)900217).

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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