Package: fereg (via r-universe)

October 22, 2026

Title Fast Fixed-Effects Estimation with the 'fixest' Interface

Version 0.4.0

Description Ordinary least squares, two-stage least squares, Poisson and logit regressions with any number of high-dimensional fixed effects, interactions of fixed effects, varying slopes, weights and iid, heteroskedasticity-robust (HC1, HC2, HC3), multiway-clustered, CRV3, Newey-West, Driscoll-Kraay or Conley standard errors. The formula syntax, arguments, results and methods follow the 'fixest' package and reproduce its estimates. The computations run in a parallel 'Rust' library that eliminates the largest fixed effect exactly and solves for the others by preconditioned conjugate gradient.

License MIT + file LICENSE

URL https://github.com/leoliu0/fereg

BugReports https://github.com/leoliu0/fereg/issues

Depends R (>= 4.2)

Imports stats

Suggests fixest, testthat (>= 3.0.0), data.table, generics, Matrix

SystemRequirements Cargo (Rust's package manager), rustc (>= 1.85)

Config/testthat/edition 3

Encoding UTF-8

LazyData true

Config/roxygen2/version 8.1.1

NeedsCompilation yes

Author Leo Liu [aut, cre, cph], Authors of the bundled Rust crates [ctb, cph] (see inst/AUTHORS for each crate's authors and license)

Maintainer Leo Liu <auleo.liu@gmail.com>

Config/pak/sysreqs libclang-dev

Repository https://cran.r-universe.dev

Date/Publication 2026-10-22 19:22:02 UTC

RemoteUrl https://github.com/cran/fereg

RemoteRef HEAD

RemoteSha c82cd1350968c10bfc2d25c1671020afac3e00ec

Contents

etable 2
feols 3
fepois 5
fereg-methods 8
fereg_multi 11
fitstat 12
fixef 12
r2 13
se 14
ssc 14
trade_toy 16
vcov_requests 16

Index **19**

`etable` *Table of estimation results*

Description

Side-by-side table of several estimations in fixest's `etable()` layout: coefficients with standard errors in parentheses and significance stars, fixed effects, variance type and fit statistics.

Usage

```
etable(
  ...,
  vcov = NULL,
  ssc = NULL,
  tex = FALSE,
  digits = 4,
  digits.stats = 5,
  fitstat = NULL,
  keep = NULL,
  drop = NULL,
  family = NULL
)
```

Arguments

`...`	`fereg` or `fereg_multi` objects (named arguments set the column titles).
`vcov`, `ssc`	Variance for every model (see summary()); `vcov` may also be a list with one variance per model, as in fixest.
`tex`	Return LaTeX code instead of a data frame.
`digits`	Significant digits of coefficients and standard errors.
`digits.stats`	Digits of the fit statistics, as in fixest: a number (significant digits, at least one decimal for large values), or `"rN"` (round to N decimals) / `"sN"`.
`fitstat`	Fit statistics (see `fitstat()`). The default is fixest's: observations, R2 and within R2 (adjusted R2 without fixed effects) when every model is OLS, else observations, squared correlation, pseudo R2 and BIC.
`keep`, `drop`	Character vectors of regular expressions (Perl syntax) selecting the coefficient rows, as in fixest: `keep` shows the coefficients matching any of them, then `drop` removes those matching any of them. Names are matched as displayed (the intercept is `"Constant"`); a leading `"%"` matches the original names instead (`"(Intercept)"`), and a leading `"!"` negates the expression.
`family`	Show the row "Family" (OLS, Poisson, Logit); by default only when the models are of different families.

Value

A data frame (class `fereg_etable`) or, with `tex = TRUE`, a character string (class `fereg_etable_tex`).

Examples

```
data(trade_toy, package = "fereg")
m1 <- feols(y ~ x1 + x2 | id + year, trade_toy, nthreads = 2)
m2 <- fepois(count ~ x1 + x2 | id + year, trade_toy, nthreads = 2)
etable(m1, m2, vcov = ~id)
etable(m1, tex = TRUE)
```

`feols` *Fixed-effects OLS and IV estimation*

Description

Drop-in replacement for `fixest::feols()`: same formula syntax, arguments and defaults, same numbers. Estimation runs in the fereg Rust core.

Usage

```
feols(
  fml,
  data,
  vcov,
  weights,
  offset,
  subset,
  split,
  fsplit,
  cluster,
  se,
  ssc,
  panel.id,
  fixef.rm = "perfect_fit",
  fixef.tol = 1e-08,
  fixef.iter = 16000,
  collin.tol = 1e-09,
  nthreads = getOption("fereg.nthreads", default_threads()),
  lean = FALSE,
  notes = getOption("fereg.notes", TRUE),
  ...
)
```

Arguments

`fml`	A formula `y ~ x1 + x2 | fe1 + fe2 | endo ~ inst`. The fixed-effects part accepts interactions `fe1^fe2` and varying slopes `fe[x]` (fixed effect and slope) or `fe[[x]]` (slope only). The right-hand side accepts `i()`, `factor()`, `I()`, functions of variables, interactions and `-1`. Several dependent variables `c(y1, y2)` and the stepwise functions `sw()`, `sw0()`, `csw()`, `csw0()` (right-hand side and fixed-effects part) give multiple estimations.
`data`	A data frame (or a list of equal-length vectors).
`vcov`	Variance type, as in fixest: a string (`"iid"`, the default; `"hetero"` (HC1), `"hc2"`, `"hc3"`, `"cluster"` (first `panel.id` variable, else first fixed effect), `"twoway"`, `"threeway"`, `"fourway"`, `"NW"` / `"newey_west"`, `"DK"` / `"driscoll_kraay"`, `"conley"`, and fereg's extension `"crv3"`; case and unique abbreviations are accepted), a one-sided formula (`~cl`, `~cl1 + cl2`, up to four dimensions, `~cl1^cl2` clusters on the interaction), a formula `type ~ variables` (`NW ~ id + period`, `NW(2) ~ id + period`, `NW ~ period` (time series without `panel.id`), `DK(2) ~ period`, `conley(100) ~ lat + lon`, `conley("60mi") ~ lat + lon`, `crv3 ~ g1 + g2`; `+ ssc(...)` among the variables sets the small-sample correction) or a request object (see vcov_requests). Variables of Newey-West and Driscoll-Kraay variances default to `panel.id`, Conley coordinates are guessed from the column names. Rows with missing values in a variance variable are removed (counted as "vcov" in the NA note).
`weights`	Observation weights: a one-sided formula (`~w`), a column name or a vector.

offset	Offset on the link scale: a one-sided formula, a column name or a vector.
subset	Rows to use: logical or integer vector, or a one-sided formula (~year > 2000).
split, fsplit	A one-sided formula (or column name): one estimation per value of the variable; fsplit adds the full sample first.
cluster, se	Former fixest ways of requesting a variance type (cluster = ~g, se = "hetero").
ssc	Small-sample correction, see ssc().
panel.id	Panel identifiers, as in fixest: a formula ~unit + time or a string "unit,time". They are the default unit and time of Newey-West / Driscoll-Kraay variances and the default cluster of vcov = "cluster". (fereg has no lag operators.)
fixef.rm	"perfect_fit" (default; singletons, plus fixed-effect groups with a perfectly fitted outcome in GLMs), "singleton" or "none".
fixef.tol, fixef.iter	Tolerance and iteration cap of the fixed-effects solver.
collin.tol	Collinearity tolerance (fixest rule).
nthreads	Number of threads; 0 = all logical cores. Defaults to option fereg.nthreads, else all cores, capped at OMP_THREAD_LIMIT when set (2 under R CMD check, i.e. when _R_CHECK_LIMIT_CORES_ is set).
lean	If TRUE, residuals, fitted values and the estimation state are not kept (post-hoc variances then need a new estimation).
notes	Print notes about removed observations (option fereg.notes, default TRUE).
...	Not used; unknown arguments are an error.

Value

An object of class fereg (or fereg_multi for multiple estimations).

Examples

```
data(trade_toy, package = "fereg")
m <- feols(y ~ x1 + x2 | id + year, trade_toy, nthreads = 2)
m
summary(m, vcov = ~id)
```

---

fepois *Fixed-effects Poisson and logit estimation*

Description

Drop-in replacements for fixest::fepois() and fixest::feglm() (Poisson and logit families).

Usage

```
fepois(
  fml,
  data,
  vcov,
  offset,
  weights,
  subset,
  split,
  fsplit,
  cluster,
  se,
  ssc,
  panel.id,
  fixef.rm = "perfect_fit",
  fixef.tol = 1e-08,
  fixef.iter = 16000,
  glm.iter = 25,
  glm.tol = 1e-08,
  collin.tol = 1e-09,
  nthreads = getOption("fereg.nthreads", default_threads()),
  lean = FALSE,
  notes = getOption("fereg.notes", TRUE),
  ...
)

feglm(
  fml,
  data,
  family = "logit",
  vcov,
  offset,
  weights,
  subset,
  split,
  fsplit,
  cluster,
  se,
  ssc,
  panel.id,
  fixef.rm = "perfect_fit",
  fixef.tol = 1e-08,
  fixef.iter = 16000,
  glm.iter = 25,
  glm.tol = 1e-08,
  collin.tol = 1e-09,
  nthreads = getOption("fereg.nthreads", default_threads()),
  lean = FALSE,
```

```
  notes = getOption("fereg.notes", TRUE),
  ...
)
```

Arguments

fml	A formula y ~ x1 + x2 | fe1 + fe2 | endo ~ inst. The fixed-effects part accepts interactions fe1^fe2 and varying slopes fe[x] (fixed effect and slope) or fe[[x]] (slope only). The right-hand side accepts i(), factor(), I(), functions of variables, interactions and -1. Several dependent variables c(y1, y2) and the stepwise functions sw(), sw0(), csw(), csw0() (right-hand side and fixed-effects part) give multiple estimations.
data	A data frame (or a list of equal-length vectors).
vcov	Variance type, as in fixest: a string ("iid", the default; "hetero" (HC1), "hc2", "hc3", "cluster" (first panel.id variable, else first fixed effect), "twoway", "threeway", "fourway", "NW" / "newey_west", "DK" / "driscoll_kraay", "conley", and fereg's extension "crv3"; case and unique abbreviations are accepted), a one-sided formula (~cl, ~cl1 + cl2, up to four dimensions, ~cl1^cl2 clusters on the interaction), a formula type ~ variables (NW ~ id + period, NW(2) ~ id + period, NW ~ period (time series without panel.id), DK(2) ~ period, conley(100) ~ lat + lon, conley("60mi") ~ lat + lon, crv3 ~ g1 + g2; + ssc(...) among the variables sets the small-sample correction) or a request object (see vcov_requests). Variables of Newey-West and Driscoll-Kraay variances default to panel.id, Conley coordinates are guessed from the column names. Rows with missing values in a variance variable are removed (counted as "vcov" in the NA note).
offset	Offset on the link scale: a one-sided formula, a column name or a vector.
weights	Observation weights: a one-sided formula (~w), a column name or a vector.
subset	Rows to use: logical or integer vector, or a one-sided formula (~year > 2000).
split, fsplit	A one-sided formula (or column name): one estimation per value of the variable; fsplit adds the full sample first.
cluster, se	Former fixest ways of requesting a variance type (cluster = ~g, se = "hetero").
ssc	Small-sample correction, see ssc().
panel.id	Panel identifiers, as in fixest: a formula ~unit + time or a string "unit,time". They are the default unit and time of Newey-West / Driscoll-Kraay variances and the default cluster of vcov = "cluster". (fereg has no lag operators.)
fixef.rm	"perfect_fit" (default; singletons, plus fixed-effect groups with a perfectly fitted outcome in GLMs), "singleton" or "none".
fixef.tol, fixef.iter	Tolerance and iteration cap of the fixed-effects solver.
glm.tol, glm.iter	IRLS convergence tolerance (relative deviance change) and iteration cap.
collin.tol	Collinearity tolerance (fixest rule).
nthreads	Number of threads; 0 = all logical cores. Defaults to option fereg.nthreads, else all cores, capped at OMP_THREAD_LIMIT when set (2 under R CMD check, i.e. when _R_CHECK_LIMIT_CORES_ is set).

lean	If TRUE, residuals, fitted values and the estimation state are not kept (post-hoc variances then need a new estimation).
notes	Print notes about removed observations (option fereg.notes, default TRUE).
...	Not used; unknown arguments are an error.
family	"poisson" / poisson() or "logit" / "binomial" / binomial().

Value

An object of class fereg (or fereg_multi).

Examples

```
data(trade_toy, package = "fereg")
p <- fepois(count ~ x1 | id + year, trade_toy, nthreads = 2)
p
```

---

fereg-methods *Methods for fereg objects*

Description

Accessors, post-hoc variances, predictions and fixed effects of feols(), fepois() and feglm() results, as in fixest.

Usage

```
## S3 method for class 'fereg'
summary(
  object,
  vcov = NULL,
  ssc = NULL,
  cluster = NULL,
  se = NULL,
  stage = 2,
  ...
)

## S3 method for class 'fereg'
coef(object, ...)

## S3 method for class 'fereg'
vcov(
  object,
  vcov = NULL,
  ssc = NULL,
  attr = FALSE,
  cluster = NULL,
```

```
  se = NULL,
  ...
)

## S3 method for class 'fereg'
confint(
  object,
  parm,
  level = 0.95,
  vcov = NULL,
  ssc = NULL,
  cluster = NULL,
  se = NULL,
  ...
)

## S3 method for class 'fereg'
nobs(object, ...)

## S3 method for class 'fereg'
residuals(
  object,
  type = c("response", "deviance", "pearson", "working"),
  na.rm = TRUE,
  ...
)

## S3 method for class 'fereg'
fitted(object, type = c("response", "link"), na.rm = TRUE, ...)

## S3 method for class 'fereg'
predict(object, newdata, type = c("response", "link"), ...)

## S3 method for class 'fereg'
logLik(object, ...)

## S3 method for class 'fereg'
AIC(object, ..., k = 2)

## S3 method for class 'fereg'
BIC(object, ...)

## S3 method for class 'fereg'
deviance(object, ...)

## S3 method for class 'fereg'
sigma(object, ...)
```

Arguments

`object`	A `fereg` object.
`vcov`, `ssc`, `cluster`, `se`	Post-hoc variance (same forms as in `feols()`, including the request objects of vcov_requests); computed from the retained estimation state without re-estimating, except CRV3, whose leave-one-cluster-out refits re-estimate the model on the estimation data (found again from the call). `NULL` keeps the estimation's variance.
`stage`	IV only: `1` first stage(s), `2` second stage (default), `1:2` both.
`...`	Not used.
`attr`	Add the attributes `type`, `df.K`, `df.t` (and `G`) to the matrix.
`parm`	Coefficients (names or indices); all by default.
`level`	Confidence level.
`type`	`resid()`: `"response"`, `"deviance"`, `"pearson"` or `"working"`; `fitted()` / `predict()`: `"response"` or `"link"`.
`na.rm`	`FALSE` returns one value per row of the estimation data (NA for removed rows).
`newdata`	A data frame for predictions; fixed-effect levels absent at estimation give NA.
`k`	AIC penalty per parameter.

Value

`summary()`: the `fereg` object with the requested variance (coefficient table in `$coeftable`); for IV with `stage = 1` or `1:2`, the requested stages (a `fereg_multi` when there are several). `coef()`: named vector of coefficients. `vcov()`: variance matrix. `confint()`: data frame of lower and upper bounds, one row per coefficient. `nobs()`: number of observations. `resid()`, `fitted()`, `predict()`: numeric vectors. `logLik()`: object of class `logLik`. `AIC()`, `BIC()`, `deviance()`, `sigma()`: numbers.

Examples

```
data(trade_toy, package = "fereg")
m <- feols(y ~ x1 + x2 | id + year, trade_toy, nthreads = 2)
summary(m, vcov = "hetero")
coef(m)
vcov(m, vcov = ~id)
confint(m, level = 0.9)
head(predict(m, newdata = trade_toy))
c(AIC = AIC(m), BIC = BIC(m))
```

fereg_multi *Multiple estimations*

Description

A fereg_multi object is a list of fereg objects (one per estimation, fixest order: sample, fixed effects, dependent variable, right-hand side). Methods apply to every estimation.

Usage

```
## S3 method for class 'fereg_multi'
print(x, ...)

## S3 method for class 'fereg_multi'
x[i]

## S3 method for class 'fereg_multi'
as.list(x, ...)

## S3 method for class 'fereg_multi'
summary(object, ...)

## S3 method for class 'fereg_multi'
coef(object, ...)

## S3 method for class 'fereg_multi'
nobs(object, ...)
```

Arguments

x, object	A fereg_multi object.
...	Passed to the methods of each estimation.
i	Indices or names of estimations.

Value

print(): x, invisibly. [and summary(): a fereg_multi object. as.list(): a list of fereg objects. coef(): data frame with one row per estimation and one column per coefficient. nobs(): number of observations of each estimation.

Examples

```
data(trade_toy, package = "fereg")
ms <- feols(y ~ csw(x1, x2) | id + year, trade_toy, nthreads = 2)
ms
coef(ms)
nobs(ms)
summary(ms[2], vcov = ~id)
```

fitstat — *Fit statistics*

Description

Same types and names as fixest's `fitstat()`: `n`, `rmse`, `r2`, `ar2`, `wr2`, `war2`, `ll`, `pr2`, `apr2`, `cor2` (`sq.cor`), `aic`, `bic`, `f`, `my`, g and, for IV, `ivf1` (`ivf`), `ivwald1` (`ivwald`), `wh` and `sargan`.

Usage

```
fitstat(x, type, simplify = FALSE, ...)
```

Arguments

`x`	A `fereg` object.
`type`	A character vector of types, or a one-sided formula (`~ r2 + ivf1`).
`simplify`	Return a plain vector when every statistic is a single number.
`...`	Not used.

Value

An object of class `fereg_fitstat` (a named list), or a vector if `simplify`.

Examples

```
data(trade_toy, package = "fereg")
m <- feols(y ~ x1 + x2 | id + year, trade_toy, nthreads = 2)
fitstat(m, ~ n + r2 + wr2)
```

fixef — *Fixed effects of an estimation*

Description

Fixed-effect coefficients with fixest's normalization: the first fixed effect is free, and in every connected component one level of each other fixed effect is set to 0 (counted in the `references` attribute). Varying slopes are listed as `fe[[x]]`.

Usage

```
fixef(object, ...)
```

Arguments

`object`	A `fereg` object.
`...`	Not used.

Value

A list (class `fereg.fixef`) of named vectors, one per fixed effect / slope.

Examples

```
data(trade_toy, package = "fereg")
m <- feols(y ~ x1 + x2 | id + year, trade_toy, nthreads = 2)
fe <- fixef(m)
summary(fe)
head(fe$year)
```

---

r2 — *R-squared variants*

Description

R-squared variants

Usage

```
r2(x, type = "all")
```

Arguments

`x`	A `fereg` object.
`type`	Types among `"r2"`, `"ar2"`, `"wr2"`, `"war2"`, `"pr2"`, `"apr2"`, `"cor2"`, or `"all"`.

Value

A named numeric vector (`NA` where a type does not apply).

Examples

```
data(trade_toy, package = "fereg")
m <- feols(y ~ x1 + x2 | id + year, trade_toy, nthreads = 2)
r2(m)
```

se — *Coefficient table accessors*

Description

`se()`, `tstat()`, `pvalue()` and `coeftable()` as in fixest.

Usage

```
se(object, ...)

tstat(object, ...)

pvalue(object, ...)

coeftable(object, ...)
```

Arguments

`object`	A `fereg` (or `fereg_multi`) object.
`...`	Passed to summary() (`vcov`, `ssc`, `cluster`).

Value

Named vectors, or the coefficient matrix for `coeftable()`.

Examples

```
data(trade_toy, package = "fereg")
m <- feols(y ~ x1 + x2 | id + year, trade_toy, nthreads = 2)
se(m)
pvalue(m, vcov = "hetero")
coeftable(m, vcov = ~id)
```

ssc — *Small-sample correction*

Description

Same arguments and defaults as fixest's `ssc()`. As in fixest, the correction depends on the variance type: heteroskedasticity-robust, Newey-West, Driscoll-Kraay and Conley variances use `K.fixef = "full"` (no nesting), Newey-West and Driscoll-Kraay apply `G.adj` with `G` = the number of time periods, Conley uses `n / (n - K)`, and HC2 / HC3 use no correction at all.

Usage

```
ssc(
  K.adj = TRUE,
  K.fixef = "nonnested",
  K.exact = FALSE,
  G.adj = TRUE,
  G.df = "min",
  t.df = "min",
  adj,
  fixef.K,
  cluster.adj,
  cluster.df
)
```

Arguments

`K.adj` Multiply the variance by `(n - 1) / (n - K)` (iid, clustered, Newey-West, Driscoll-Kraay) or `n / (n - K)` (heteroskedasticity-robust, Conley).

`K.fixef` How fixed effects count in `K`: `"nonnested"` (fixed effects nested in a cluster variable do not count), `"full"` or `"none"`.

`K.exact` Count the exact number of redundant fixed-effect coefficients.

`G.adj` Multiply clustered variances by `G / (G - 1)` (Newey-West and Driscoll-Kraay: `T / (T - 1)` with `T` time periods).

`G.df` `"min"` (one factor with the smallest number of clusters) or `"conventional"` (each cluster dimension uses its own `G`).

`t.df` Degrees of freedom of the t distribution with clustered, Newey-West and Driscoll-Kraay variances: `"min"` (`G - 1`, or `T - 1`), `"conventional"` (`n - K`) or a number.

`adj`, `fixef.K`, `cluster.adj`, `cluster.df`
Former fixest names of `K.adj`, `K.fixef`, `G.adj` and `G.df`.

Value

An object of class `ssc.type`.

Examples

```
data(trade_toy, package = "fereg")
m <- feols(y ~ x1 + x2 | id + year, trade_toy, nthreads = 2)
summary(m, vcov = ~id, ssc = ssc(K.adj = FALSE, G.adj = FALSE))
```

trade_toy — *Simulated panel for examples*

Description

A small simulated panel: 600 observations of 60 units over 10 years.

Usage

```
data(trade_toy)
```

Format

A data frame with columns `id`, `year`, `x1`, `x2`, `z` (instrument), `xe` (endogenous regressor), `y`, `count` (Poisson outcome) and `binary` (0/1 outcome).

vcov_requests — *Variance requests*

Description

fixest's request objects and helpers for the `vcov` argument of `feols()`, `fepois()`, `feglm()`, summary(), vcov(), `confint()` and `etable()`. They return objects of class `fixest_vcov_request` (the same structure as fixest's, so both packages' requests are accepted). Called with an estimation as first argument, the `vcov_*()` functions return its variance matrix instead, as in fixest.

Usage

```
NW(lag = NULL)

newey_west(lag = NULL)

DK(lag = NULL)

driscoll_kraay(lag = NULL)

conley(cutoff = NULL, pixel = NULL, distance = NULL)

vcov_hetero(
  x,
  type = "hc1",
  exact = TRUE,
  boot.size = NULL,
  ssc = NULL,
  vcov_fix = TRUE
```

```
)

vcov_cluster(x, cluster = NULL, ssc = NULL, vcov_fix = TRUE)

vcov_crv3(x, cluster = NULL, ssc = NULL)

vcov_NW(x, unit = NULL, time = NULL, lag = NULL, ssc = NULL, vcov_fix = TRUE)

vcov_DK(x, time = NULL, lag = NULL, ssc = NULL, vcov_fix = TRUE)

vcov_conley(
  x,
  lat = NULL,
  lon = NULL,
  cutoff = NULL,
  pixel = 0,
  distance = "triangular",
  ssc = NULL,
  vcov_fix = TRUE
)
```

Arguments

`lag`	Number of lags (`NULL` = the default rule).
`cutoff`, `pixel`, `distance`	Conley options, see Details.
`x`	An estimation (`fereg` object), or omitted to build a request. As in fixest, when the first argument is not an estimation it is taken as the next argument (`vcov_NW("id", "t")`).
`type`	`vcov_hetero()`: `"hc1"`, `"hc2"` or `"hc3"`.
`exact`, `boot.size`	`vcov_hetero()`: fereg always computes the exact leverage (`exact = FALSE` is not supported; `boot.size` is not used).
`ssc`	A small-sample correction (`ssc()`); overrides the `ssc` argument of the caller.
`vcov_fix`	Must be `TRUE` (fereg always applies fixest's positive-definiteness fix).
`cluster`	Cluster variables: a character vector or a one-sided formula.
`unit`, `time`	Unit and time variables of Newey-West / Driscoll-Kraay (names or one-sided formulas); by default the variables of `panel.id`.
`lat`, `lon`	Latitude and longitude variables (names or one-sided formulas, degrees).

Details

- `NW(lag)` / `newey_west(lag)`: Newey-West (Bartlett kernel). With a unit and a time variable (`vcov = NW ~ id + period`, or `panel.id`), only pairs of observations of the same unit enter; with a time variable only (`NW ~ period` without `panel.id`) it is the time-series estimator. Time is the dense rank of the time variable over the estimation sample (gaps are collapsed). Default

lag: `floor(T^(1/4))` for panels, fixest's `sandwich::bwNeweyWest()` rule for a time series. Label `Newey-West (L=<lag>)`.

- `DK(lag)` / `driscoll_kraay(lag)`: Driscoll-Kraay on the per-period score sums; default lag `floor(T^(1/4))`. Label `Driscoll-Kraay (L=<lag>)`.
- `conley(cutoff, pixel, distance)`: Conley spatial HAC with fixest's uniform kernel. `cutoff` is in kilometers (a number) or a string such as `"100km"` / `"60mi"`; `NULL` deduces it from the coordinates as fixest does. `pixel` (same unit as `cutoff`, default 0) aggregates the scores on a grid first; `distance` is `"triangular"` (default, fixest's flat-earth distance) or `"spherical"` (great-circle). Latitude and longitude come from the formula (`conley(100) ~ lat + lon`) or are guessed from the column names (`lat`, `latitude`, `lat_*`; `lon`, `lng`, `long`, `longitude`, `lon_*`, ...). Label `Conley (<cutoff><km|mi>)`.
- `vcov_hetero(type)`: `"hc1"` (heteroskedasticity-robust, default), `"hc2"` or `"hc3"`. HC2 and HC3 use the exact leverage of the full model (fixed effects included) and no small-sample correction; they are not defined for IV estimations.
- `vcov_cluster(cluster)`: clustering on up to four variables (names or a formula; `a^b` interacts).
- `vcov_crv3(cluster)`: **fereg extension** (fixest has no CRV3): leave-one-cluster-out jackknife centered at the full-sample coefficients (pyfixest's CRV3), with fixest's cluster small-sample correction and multiway inclusion-exclusion. Also requested with `vcov = "crv3"` (clusters guessed as for `"cluster"`) or `vcov = crv3 ~ g1 + g2`. CRV3 needs the leave-one-out refits: after estimation (`summary(m, vcov = "crv3")`) the model is re-estimated.

Value

A `fixest_vcov_request` object, or the variance matrix of `x`.

Examples

```
data(trade_toy, package = "fereg")
m <- feols(y ~ x1 | id + year, trade_toy, panel.id = ~id + year, nthreads = 2)
summary(m, vcov = NW(1))
summary(m, vcov = DK ~ year)
summary(m, vcov = vcov_hetero(type = "hc2"))
```

Index

[.fereg_multi *(fereg_multi)*, 11

AIC.fereg *(fereg-methods)*, 8
as.list.fereg_multi *(fereg_multi)*, 11

BIC.fereg *(fereg-methods)*, 8

coef.fereg *(fereg-methods)*, 8
coef.fereg_multi *(fereg_multi)*, 11
coeftable *(se)*, 14
confint.fereg *(fereg-methods)*, 8
conley *(vcov_requests)*, 16

deviance.fereg *(fereg-methods)*, 8
DK *(vcov_requests)*, 16
driscoll_kraay *(vcov_requests)*, 16

etable, 2
etable(), *16*

feglm *(fepois)*, 5
feglm(), *8*, *16*
feols, 3
feols(), *8*, *10*, *16*
fepois, 5
fepois(), *8*, *16*
fereg-methods, 8
fereg_multi, 11
fitstat, 12
fitstat(), *3*
fitted.fereg *(fereg-methods)*, 8
fixef, 12
fixest::feglm(), *5*
fixest::feols(), *3*
fixest::fepois(), *5*

logLik.fereg *(fereg-methods)*, 8

newey_west *(vcov_requests)*, 16
nobs.fereg *(fereg-methods)*, 8
nobs.fereg_multi *(fereg_multi)*, 11

NW *(vcov_requests)*, 16

predict.fereg *(fereg-methods)*, 8
print.fereg_multi *(fereg_multi)*, 11
pvalue *(se)*, 14

r2, 13
residuals.fereg *(fereg-methods)*, 8

se, 14
sigma.fereg *(fereg-methods)*, 8
ssc, 14
ssc(), *5*, *7*, *17*
summary(), *3*, *14*, *16*
summary.fereg *(fereg-methods)*, 8
summary.fereg_multi *(fereg_multi)*, 11

trade_toy, 16
tstat *(se)*, 14

vcov(), *16*
vcov.fereg *(fereg-methods)*, 8
vcov_cluster *(vcov_requests)*, 16
vcov_conley *(vcov_requests)*, 16
vcov_crv3 *(vcov_requests)*, 16
vcov_DK *(vcov_requests)*, 16
vcov_hetero *(vcov_requests)*, 16
vcov_NW *(vcov_requests)*, 16
vcov_requests, *4*, *7*, *10*, 16