Package ‘rERR’

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Title Excess Relative Risk Models

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Description Fits a linear excess relative risk model by maximum likelihood, possibly including several variables and allowing for lagged exposures. Allow time dependent covariates.

Depends R (>= 3.5.0)

License GPL (>= 2)

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Imports survival, stats4, plyr, dplyr, reshape2, numDeriv, ggplot2

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cohort_ef

Simulated cohort of subjects exposed to ct scans

Description
List of scans received by a cohort of subjects

Usage
cohort_ef

Format
A data frame with 6315 rows and 8 variables:

- **id**: subject identifier, integer
- **sex**: sex of the subject, 1-male / 2-female
- **entry_age**: age of entry at the cohort, numeric
- **exit_age**: age at exit of the cohort, numeric
- **outcome**: disease or not, 0-no disease / 1-disease
- **age**: age at scan, numeric
- **dose**: dose of the scan, numeric in mGy
- **country**: country, character
**cohort_wf**

Simulated cohort of subjects exposed to ct scans

**Description**

List of subjects that received at least 1 scan

**Usage**

`cohort_wf`

**Format**

A data frame with 1000 rows and 80 variables:

- **id** subject identifier, integer
- **sex** sex of the subject, 1-male / 2-female
- **YearInit** Year of entry of the subject, integer
- **AgeAtEntry** age of entry at the cohort, numeric
- **age_at_event** age at exit of the cohort, numeric
- **outcome** disease or not, 0-no disease / 1-disease
- **end_status** status at exit of the cohort, 0-disease / 1-death / 2-healthy
- **ses** socio economic status, integer
- **number_of_ct** number of ct's received in all follow-up, integer
- **ctage1** middle age at i-th year of being in the cohort, numeric
- **ctage2** middle age at i-th year of being in the cohort, numeric
- **ctage3** middle age at i-th year of being in the cohort, numeric
- **ctage4** middle age at i-th year of being in the cohort, numeric
- **ctage5** middle age at i-th year of being in the cohort, numeric
- **ctage6** middle age at i-th year of being in the cohort, numeric
- **ctage7** middle age at i-th year of being in the cohort, numeric
- **ctage8** middle age at i-th year of being in the cohort, numeric
- **ctage9** middle age at i-th year of being in the cohort, numeric
- **ctage10** middle age at i-th year of being in the cohort, numeric
- **ctage11** middle age at i-th year of being in the cohort, numeric
- **ctage12** middle age at i-th year of being in the cohort, numeric
- **ctage13** middle age at i-th year of being in the cohort, numeric
- **ctage14** middle age at i-th year of being in the cohort, numeric
- **ctage15** middle age at i-th year of being in the cohort, numeric
- **ctage16** middle age at i-th year of being in the cohort, numeric
ctage17 middle age at i-th year of being in the cohort, numeric
dose1 grouped doses recived the i-th year of being in the cohort, numeric
celage18 middle age at i-th year of being in the cohort, numeric
dose2 grouped doses recived the i-th year of being in the cohort, numeric
celage19 middle age at i-th year of being in the cohort, numeric
dose3 grouped doses recived the i-th year of being in the cohort, numeric
celage20 middle age at i-th year of being in the cohort, numeric
dose4 grouped doses recived the i-th year of being in the cohort, numeric
celage21 middle age at i-th year of being in the cohort, numeric
dose5 grouped doses recived the i-th year of being in the cohort, numeric
celage22 middle age at i-th year of being in the cohort, numeric
dose6 grouped doses recived the i-th year of being in the cohort, numeric
celage23 middle age at i-th year of being in the cohort, numeric
dose7 grouped doses recived the i-th year of being in the cohort, numeric
celage24 middle age at i-th year of being in the cohort, numeric
dose8 grouped doses recived the i-th year of being in the cohort, numeric
celage25 middle age at i-th year of being in the cohort, numeric
dose9 grouped doses recived the i-th year of being in the cohort, numeric
celage26 middle age at i-th year of being in the cohort, numeric
dose10 grouped doses recived the i-th year of being in the cohort, numeric
celage27 middle age at i-th year of being in the cohort, numeric
dose11 grouped doses recived the i-th year of being in the cohort, numeric
celage28 middle age at i-th year of being in the cohort, numeric
dose12 grouped doses recived the i-th year of being in the cohort, numeric
celage29 middle age at i-th year of being in the cohort, numeric
dose13 grouped doses recived the i-th year of being in the cohort, numeric
celage30 middle age at i-th year of being in the cohort, numeric
dose14 grouped doses recived the i-th year of being in the cohort, numeric
celage31 middle age at i-th year of being in the cohort, numeric
dose15 grouped doses recived the i-th year of being in the cohort, numeric
celage32 middle age at i-th year of being in the cohort, numeric
dose16 grouped doses recived the i-th year of being in the cohort, numeric
celage33 middle age at i-th year of being in the cohort, numeric
dose17 grouped doses recived the i-th year of being in the cohort, numeric
celage34 middle age at i-th year of being in the cohort, numeric
dose18 grouped doses recived the i-th year of being in the cohort, numeric
dose19 grouped doses received the i-th year of being in the cohort, numeric
dose20 grouped doses received the i-th year of being in the cohort, numeric
dose21 grouped doses received the i-th year of being in the cohort, numeric
dose22 grouped doses received the i-th year of being in the cohort, numeric
dose23 grouped doses received the i-th year of being in the cohort, numeric
dose24 grouped doses received the i-th year of being in the cohort, numeric
dose25 grouped doses received the i-th year of being in the cohort, numeric
dose26 grouped doses received the i-th year of being in the cohort, numeric
dose27 grouped doses received the i-th year of being in the cohort, numeric
dose28 grouped doses received the i-th year of being in the cohort, numeric
dose29 grouped doses received the i-th year of being in the cohort, numeric
dose30 grouped doses received the i-th year of being in the cohort, numeric
dose31 grouped doses received the i-th year of being in the cohort, numeric
dose32 grouped doses received the i-th year of being in the cohort, numeric
dose33 grouped doses received the i-th year of being in the cohort, numeric
dose34 grouped doses received the i-th year of being in the cohort, numeric
dose35 grouped doses received the i-th year of being in the cohort, numeric
country country, character

<table>
<thead>
<tr>
<th><code>confint.rERR</code></th>
<th>Confidence intervals</th>
</tr>
</thead>
</table>

**Description**

Show the confidence intervals for each parameter of the model. The likelihood ratio test ci for linear variables, and the Wald ci for the loglinear terms

**Usage**

```r
## S3 method for class 'rERR'
confint(object, ...)
```

**Arguments**

- `object` an object of class `rERR`
- `...` for future methods

**Value**

a list with the confidence intervals

**Examples**

```r
ci.rERR(fit)
```
**f_exclusion**

**Description**

Exclude subjects in the cohort that have less than lag time of follow up

**Usage**

```r
f_exclusion(formula, data, lag)
```

**Arguments**

- **formula**: `Surv(entry_time,exit_time,outcome)~loglin(loglin_var1,...,loglin_varn)+lin(lin_var1,...,lin_varn)+strata(strat_var1,...,strat_varp)`
- **data**: initial data set
- **lag**: latency period

**Value**

a data set with the exclusion updated

**Examples**

```r
f_exclusion(formula, data, lag)
```

**f_fit_linERR**

**Description**

function that calls the optimization (mle from stats4 package, so use optim), and return a rERR object with the estimation and summary

**Usage**

```r
f_fit_linERR(formula, data, rsets, n_lin_vars, n_loglin_vars, id_name, time_name)
```
**Arguments**

- **formula**: `Surv(entry_time, exit_time, outcome) ~ loglin(loglin_var1,...,loglin_varn) + lin(lin_var1,...,lin_varn) + strata(strat_var1,...,strat_varp)`
- **data**: data set returned from `f_to_model_data`
- **rsets**: list of risksets, output of `f_risksets`
- **n_lin_vars**: number of linear variables (attribute of the `to_model_data`)
- **n_loglin_vars**: number of loglinear variables (attribute of the `to_model_data`)
- **id_name**: name of variable containing the names of subjects
- **time_name**: name of the time variable

**Value**

rERR object with the estimation

**Examples**

```r
f_fit_linerr(formula, data, rsets, n_lin_vars, n_loglin_vars, id_name, time_name)
```

---

**Description**

function that calls the optimization (mle from stats4 package, so use optim), and return a rERR object with the estimation and summary

**Usage**

```r
f_fit_linerr_all(formula, data, id_name, time_name, lag)
```

**Arguments**

- **formula**: `Surv(entry_time, exit_time, outcome) ~ loglin(loglin_var1,...,loglin_varn) + lin(lin_var1,...,lin_varn) + strata(strat_var1,...,strat_varp)`
- **data**: data set returned from `f_to_model_data`
- **id_name**: name of variable containing the names of subjects
- **time_name**: name of the time variable
- **lag**: latency period

**Value**

rERR object with the estimation

**Examples**

```r
f_fit_linerr_all(formula, data, id_name, time_name, lag)
```
Description

function that calls the optimization (mle from stats4 package, so use optim) from an event format data set, and return a rERR object with the estimation and summary

Usage

f_fit_linerr_ef(formula, data, id_name, dose_name, time_name, covars_names, lag,
exclusion_done = F)

Arguments

formula Surv(entry_time, exit_time, outcome) ~ loglin(loglin_var1, ..., loglin_varn) +
lin(lin_var1, ..., lin_varm) + strata(strat_var1, ..., strat_varp)
data data set returned from f_to_model_data
id_name name of variable containing the names of subjects
dose_name name of variable containing the doses at each time
time_name name of the time variable
covars_names a character vector with the names of the variables used as covariates in the formula (adjustments and stratification)
lag latency period
exclusion_done a logical indicating wheather the exclusion is already done or not

Value

rERR object with the estimation

Examples

# set the formulas for the models
formula1 <- Surv(entry_age, exit_age, outcome) ~ lin(dose_cum) + strata(sex)
formula2 <- Surv(entry_age, exit_age, outcome) ~ loglin(factor(country)) + lin(dose_cum) +
strata(sex)

# fit the models
fit1 <- f_fit_linerr_ef(formula1, data=cohort_ef, id_name="id", dose_name="dose",
time_name="age", covars_names=c("sex"), lag=2, exclusion_done=TRUE)
fit2 <- f_fit_linerr_ef(formula2, data=cohort_ef, id_name="id", dose_name="dose",
time_name="age", covars_names=c("sex", "country"), lag=2, exclusion_done=TRUE)

# display a summary
summary(fit1)
summary(fit2)
# confidence intervals
confint(fit1)
confint(fit2)

# likelihood ratio test between nested and nesting models
f_lrt(fit1, fit2)

---

**f_fit_linERR_wf**

*fit Excess Relative Risk Model*

**Description**

function that calls the optimization (mle from stats4 package, so use optim) from an event format data set, and return a rERR object with the estimation and summary

**Usage**

```r
f_fit_linERR_wf(formula, data, id_name, doses, times, covars, lag, exclusion_done = F)
```

**Arguments**

- **formula**: Surv(entry_time, exit_time, outcome) ~ loglin(loglin_var1, ..., loglin_varn) + lin(lin_var1, ..., lin_varm) + strata(strat_var1, ..., strat_varp)
- **data**: data set returned from f_to_model_data
- **id_name**: name of variable containing the names of subjects
- **doses**: sub data set of grouped doses
- **times**: sub data set of times relatives to doses
- **covars**: sub data set of the covars that will be involved in the model (adjustments and stratification)
- **lag**: latency period
- **exclusion_done**: a logical indicating wheather the exclusion is already done or not

**Value**

rERR object with the estimation

**Examples**

```r
# set the formulas for the models
formula1 <- Surv(AgeAtEntry, age_at_event, outcome) ~ lin(dose_cum) + strata(sex)
formula2 <- Surv(AgeAtEntry, age_at_event, outcome) ~ loglin(factor(country)) + lin(dose_cum) + strata(sex)
```
# fit the models
fit1 <- f_fit_linERR_wf(formula1, data=cohort_wf, id_name="id", doses=cohort_wf[45:79], times=cohort_wf[10:44], covars=cohort_wf[, c("sex", "country")], lag=2, exclusion_done = FALSE)

fit2 <- f_fit_linERR_wf(formula2, data=cohort_wf, id_name="id", doses=cohort_wf[45:79], times=cohort_wf[10:44], covars=cohort_wf[, c("sex", "country")], lag=2, exclusion_done = FALSE)

# display a summary
summary(fit1)
summary(fit2)

# confidence intervals
confint(fit1)
confint(fit2)

# likelihood ratio test between nested and nesting models
f_lrt(fit1, fit2)

---

**f_lrt**  
*likelihood ratio test*

---

**Description**

function that compute the lrt test for a nested and a nesting models

**Usage**

f_lrt(fit1, fit2)

**Arguments**

- fit1: the nested model
- fit2: the nesting model

**Value**

a list containing the lrt statistic and the corresponding p_value from the Chi-square test

**Examples**

lrt(fit1, fit2)
**f_parse_formula**

*Parse formula (internal use)*

**Description**

Return list with the terms and elements of the formula

**Usage**

```r
f_parse_formula(formula)
```

**Arguments**

- `formula` - `Surv(entry_time,exit_time,outcome)~loglin(loglin_var1,..,loglin_varn)+lin(lin_var1,...,lin_varm)+strata(strat_var1,...,strat_varp)`

**Value**

list of terms in the formula

**Examples**

```r
f_parse_formula(formula)
```

---

**f_plot_linERR**

*plot the likelihood*

**Description**

plot the partial log likelihood function in the case of one dimension in the linear part

**Usage**

```r
f_plot_linERR(object, formula, data, rsets, n_lin_vars, n_loglin_vars, id_name, time_name)
```

**Arguments**

- `object` - An rERR class object
- `formula` - `Surv(entry_time,exit_time,outcome)~loglin(loglin_var1,...,loglin_varn)+lin(lin_var1,...,lin_varm)+strata(strat_var1,...,strat_varp)`
- `data` - data set returned from `f_to_model_data`
- `rsets` - list of risksets, output of `f_risksets`
- `n_lin_vars` - number of linear variables (attribute of the `to_model_data`)
- `n_loglin_vars` - number of loglinear varaibles (attribute of the `to_model_data`)
- `id_name` - name of variable containing the names of subjects
- `time_name` - name of the time variable
**Value**

rERR object with the estimation

**Examples**

\[ f_{\text{fit\_linERR}}(\text{formula}, \text{data}, \text{sets}, \text{n\_lin\_vars}, \text{n\_loglin\_vars}, \text{id\_name}, \text{time\_name}) \]

---

**f\_plot\_linERR\_ef**

plot likelihood function from ef

**Description**

plot the partial log likelihood function in the case of one dimension in the linear part

**Usage**

\[ f_{\text{plot\_linERR\_ef}}(\text{object}, \text{formula}, \text{data}, \text{id\_name}, \text{dose\_name}, \text{time\_name}, \text{covars\_names}, \text{lag}, \text{exclusion\_done} = \text{F}) \]

**Arguments**

- **object**
  - an rERR class object
- **formula**
  - \( \text{Surv(entry\_time,exit\_time,outcome)} - \text{loglin(loglin_var1,...,loglin_varn)} + \text{lin(lin_var1,...,lin_varm)} + \text{strata(strat_var1,...,strat_varp}) \)
- **data**
  - data set returned from \( f_{\text{to\_model\_data}} \)
- **id\_name**
  - name of variable containing the names of subjects
- **dose\_name**
  - name of variable containing the doses at each time
- **time\_name**
  - name of the time variable
- **covars\_names**
  - a character vector with the names of the variables used as covariates in the formula (adjustments and stratification)
- **lag**
  - latency period
- **exclusion\_done**
  - a logical indicating whether the exclusion is already done or not

**Value**

rERR object with the estimation
**Examples**

```r
# set the formulas for the models
formula1 <- Surv(entry_age, exit_age, outcome) ~ lin(dose_cum) + strata(sex)

# fit the model
fit1 <- f_fit_linerr_ef(formula1, data=cohort_ef, id_name="id", dose_name="dose",
                        time_name="age", covars_names=c("sex"), lag=2, exclusion_done=TRUE)

# plot the partial loglikelihood function
f_plot_linerr_ef(fit1, formula1, data=cohort_ef, id_name="id", dose_name="dose",
                 time_name="age", covars_names=c("sex"), lag=2, exclusion_done=TRUE)
```

**Description**

plot the partial log likelihood function in the case of one dimension in the linear part

**Usage**

```r
f_plot_linerr_wf(object, formula, data, id_name, doses, times, covars, lag,
                  exclusion_done = F)
```

**Arguments**

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>object</td>
<td>an rERR class object</td>
</tr>
<tr>
<td>formula</td>
<td>Surv(entry_time,exit_time,outcome)~loglin(loglin_var1,...,loglin_varn)+</td>
</tr>
<tr>
<td></td>
<td>lin(lin_var1,...,lin_varm)+strata(strat_var1,...,strat_varp)</td>
</tr>
<tr>
<td>data</td>
<td>data set returned from f_to_model_data</td>
</tr>
<tr>
<td>id_name</td>
<td>name of variable containing the names of subjects</td>
</tr>
<tr>
<td>doses</td>
<td>sub data set of grouped doses</td>
</tr>
<tr>
<td>times</td>
<td>sub data set of times relatives to doses</td>
</tr>
<tr>
<td>covars</td>
<td>sub data set of the covars that will be involved in the model (adjustments and stratification)</td>
</tr>
<tr>
<td>lag</td>
<td>latency period</td>
</tr>
<tr>
<td>exclusion_done</td>
<td>a logical indicating wheather the exclusion is already done or not</td>
</tr>
</tbody>
</table>

**Value**

rERR object with the estimation
Examples

# set the formulas for the models
formula1 <- Surv(AgeAtEntry, age_at_event, outcome) ~ lin(dose_cum) + strata(sex)

# fit the model
fit1 <- f_fit_linerr_wf(formula1, data=cohort_wf, id_name="id", doses=cohort_wf[,45:79],
                       times=cohort_wf[,10:44], covars=cohort_wf[,c("sex","country")],
                       lag=2, exclusion_done = FALSE)

# plot the partial loglikelihood function
f_plot_linerr_wf(fit1, formula1, data=cohort_wf, id_name="id", doses=cohort_wf[,45:79],
                 times=cohort_wf[,10:44], covars=cohort_wf[,c("sex","country")],
                 lag=2, exclusion_done = FALSE)

---

f_risksets

Risks

description

Computes the riskset for each case with the relevant variables in the formula and the stratification
vars specified in strata() part of the formula. The riskset of a case include the subjects that are in
the cohort when the case occurs: so a subject S belongs to the riskset R of the case that have a 'fail'
at time ft, if S_entry_time < ft <= S_exit_time.

Usage

f_risksets(formula, data, lag, id_name, time_name)

Arguments

formula Surv(entry_time,exit_time,outcome)~loglin(loglin_var1,...,loglin_varn)+
            lin(lin_var1,...,lin_varm)+strata(strat_var1,...,strat_varp)
data event format data set than is ouput of the functions f_to_event...
lag latency period
id_name name of variable containing the names of subjects
time_name name of the time variable

Value

a named list with integer vectors containing the number of rows that are in each the riskset (relevant
person-time)

Examples

f_riskset(formula, data, lag=2, id_name='patientids', time_name='time')
Data transformation: Event format -> Event format required for the model

Description

This function organizes an input data set ef (event format), to the required ef data set for the model. It appends an index of person event 1,2..n,0 if a subject has n doses and being the 0-row the exit conditions: exit time, exit dose and the outcome. Also creates the cumulated dose.

Usage

f_to_event_table_ef_all(formula, data, id_name, dose_name, time_name, covars_names)

Arguments

formula  Surv(entry_time,exit_time,outcome)~loglin(loglin_var1,...,loglin_varn)+
            (lin_var1,...,lin_varm)+strata(strat_var1,...,strat_varp)
data     input data set - event format data set
id_name  name of variable containing the names of subjects
dose_name name of the dose variable
time_name name of the time variable
covars_names names of the covars required later in the model

Value

The data set with the event-row format, including the event of exit of the cohort as a row where the outcome is set

Examples

f_to_event_table_ef_all(formula, data, id_name='patientids',
dose_name='dose', time_name='time',
covars=c('sex','country','birthcohort'))
f_to_event_table_ef_v2

Data transformation: Event format -> Event format required for the model (internal use)

Description

This function organizes an input data set ef, same as f_to_event_table_ef_all but with start, stop, and outcome from the formula.

Usage

f_to_event_table_ef_v2(id, start, stop, outcome, data, times, doses, covars)

Arguments

id name of variable containing the names of subjects
start name of the variable containing the start time
stop name of the variable containing the stop time
outcome name of the variable containing the outcome
data input data set
times name of the time variable
doses name of the dose variable
covars names of the covars required later in the model

Value

The data set with the event-row format, including the event of exit of the cohort

Examples

f_to_event_table_ef_v2(id = 'patientids', start = 'entry_age', stop = 'exit_age', outcome = 'leukaemia', data, times = 'age', doses = 'ActMar_med', covars = c('sex', 'country', 'birthcohort'))
**f_to_event_table_wf_all**

Data transformation: Wide format -> Event format required for the model

---

**Description**

This function organizes an input data set `wf` (wide format, same input as in Epicrue Peanuts), to the required `ef` data set for the model. It appends an index of person event `1,2..n,0` if a subject has `n` doses (or grouped doses), and being the `0-row` the exit conditions: exit time, exit dose and the outcome. Also creates the cumulated dose.

**Usage**

```r
f_to_event_table_wf_all(formula, data, id_name, doses, times, covars)
```

**Arguments**

- `formula`:
  ```r
  Surv(entry_time,exit_time,outcome)~loglin(loglin_var1,...,loglin_varn)+
  lin(lin_var1,...,lin_varm)+strata(strat_var1,...,strat_varp)
  ```

- `data`:
  Input data set - event format data set

- `id_name`:
  Name of variable containing the names of subjects

- `doses`:
  Sub data set of grouped doses

- `times`:
  Sub data set of times relatives to doses

- `covars`:
  Sub data set of the covars that will be involved in the model

**Value**

The data set with the event-row format, including the event of exit of the cohort

**Examples**

```r
f_to_event_table_wf_all(formula, data, id_name='patientids', doses=data[,31:50],
                        times=data[,11:30], covars=data[,c('sex','country','birthcohort')])
```

---

**f_to_event_table_wf_v2**

Data transformation: Wide format -> Event format required for the model (internal use)

---

**Description**

This function organizes an input data set `wf` (wide format) to `ef` (event format), same as `f_to_event_table_wf_all` but with the start, stop and outcome from the formula
Usage

`f_to_event_table_wf_v2(id, start, stop, outcome, data, times, doses, covars)`

Arguments

- `id` name of variable containing the names of subjects
- `start` names of the variable containing the start time
- `stop` names of the variable containing the stop time
- `outcome` name of the variable containing the outcome
- `data` input data set - wide format data set
- `times` sub data set of times relatives to doses
- `doses` sub data set of grouped doses
- `covars` sub data set of the covars that will be involved in the model

Value

The data set with the event-row format, including the event of exit of the cohort

Examples

```r
f_to_event_table_wf_v2(id='patientids', start='entry_age', stop='exit_age',
outcome='leukaemia', data,times=data[,11:30],doses=data[,31:50],
covars=data[,c('sex','country','birthcohort')])
```

`f_to_model_data`  

*Data transformation: keep model variables and expand categorical variables (internal use)*

Description

Transform the data set in a closed form `n_row | id_name | n_pe | entry_name | exit_name | outcome | time | linear_covariates | loglinear_covariates.  
Expand if a variable is categorical to pure logical `n_categories` variables (excluding the reference category)

Usage

`f_to_model_data(formula, data, id_name, time_name)`

Arguments

- `formula` `Surv(entry_time,exit_time,outcome)~loglin(loglin_var1,...,loglin_varn)+
lin(lin_var1,...,lin_varm)+strata(strat_var1,...,strat_varp)`
- `data` data set
- `id_name` name of variable containing the names of subjects
- `time_name` name of the time variable
Value
data set described below

Examples

```r
def_to_model_data(formula, data, id_name = 'patientids', time_name = 'time')
```

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**Description**

Print the confidence intervals of rERR fit

**Usage**

```r
## S3 method for class 'ci.rERR'
print(x, ...)
```

**Arguments**

- `x`:
  - a `ci.rERR` object

- `...`:
  - for future methods

---

---

**Description**

Print the summary of rERR fit

**Usage**

```r
## S3 method for class 'summary.rERR'
print(x, ...)
```

**Arguments**

- `x`:
  - a `summary.rERR` object

- `...`:
  - for future methods
Description

display summary of the parameter and statistics of the model

Usage

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

Arguments

object an object of class rERR
...
for future methods

Value

a list with the summary elements

Examples

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