Package ‘DisaggregateTS’

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Title High-Dimensional Temporal Disaggregation

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RdMacros Rdpack

License GPL (>= 3)

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Author Luke Mosley [aut, cre],
Kaveh S. Nobari [aut] (<https://orcid.org/0000-0002-4053-0781>)

Maintainer Luke Mosley <l.mosley@lancaster.ac.uk>

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SparseTD  
*High-Dimensional Temporal Disaggregation*

**Description**
This function provides the Sparse Temporal Disaggregation (spTD) methods proposed by Mosley et al. (2021) to perform temporal disaggregation of time series data in both standard and high-dimensional settings. Variable selection is also performed by a LASSO penalty Tibshirani (1996) or an Adaptive LASSO penalty Zou (2006).

**Usage**
```r
SparseTD(
  Y,
  X = matrix(data = rep(1, times = nrow(Y)), nrow = nrow(Y)),
  penalty = "lasso",
  aggMat = "sum"
)
```

**Arguments**
- `Y` The low-frequency response vector.
- `X` The high-frequency indicator matrix.
- `penalty` Nominates the choice of regularisation (`'lasso'` or `'adalasso'`).
- `aggMat` Aggregation matrix according to `'first'`, `'sum'`, `'average'`, `'last'`.

**Value**
- `y_Est` Estimated high-frequency response series.
- `beta_Est` Estimated coefficient vector.
- `rho_Est` Estimated residual autocorrelation parameter.
- `ul_Est` Estimated aggregate residual series.
- `lambda` Tuning parameter used for lasso/adalasso.

**References**
Examples

data = TempDisaggDGP(n_l=50,m=4,p=10,beta=3,sparsity=0.5,method='Chow-Lin',rho=0.5)
X = data$X_Gen
Y = data$Y_Gen
fit_spTD = SparseTD(Y=Y, X=X)
y_hat = fit_spTD$y_Est

Description

This function generates the high-frequency \( mn_l \times 1 \) response vector \( y \), according to
\[
y = X \beta + \epsilon
\]
where \( X \) is an \( mn_l \times p \) matrix of indicator series, and the \( mn_l \times 1 \) coefficient vector may be sparse. The low-frequency \( n_l \times 1 \) vector \( Y \) can be generated by pre-multiplying a disaggregation matrix \( n_l \times mn_l \) matrix, such that the sum, the average, the last or the first value of \( y \) equates the corresponding \( Y \) observation. For a comprehensive review, see Dagum and Cholette (2006).

Usage

TempDisaggDGP(
  n_l,  
m,  
p = 1,  
beta = 1,  
sparsity = 1,  
method = "Denton-Cholette",  
aggMat = "sum",  
rho = 0,  
mean_X = 0,  
sd_X = 1,  
sd_e = 1,  
simul = FALSE,  
setSeed = 42
)

Arguments

- \( n_l \): Size of the low frequency series.
- \( m \): The integer multiple for generating the high-frequency series.
- \( p \): The number of high-frequency indicator series to include.
- \( \beta \): The positive and negative beta elements for the coefficient vector.
- \( \text{sparsity} \): Sparsity percentage of the coefficient vector.
- \( \text{method} \): DGP according to 'Denton', 'Denton-Cholette', 'Chow-Lin', 'Fernandez', 'Litterman'.
aggMat: Aggregation matrix according to 'first', 'sum', 'average', 'last'.
rho: The residual autocorrelation coefficient. Default is 0.
mean_X: Mean of the design matrix. Default is 0.
std_X: Standard deviation of the design matrix. Default is 1.
std_e: Standard deviation of the errors. Default is 1.
simul: When 'TRUE' the design matrix and the coefficient vector are fixed.
setSeed: The seed used when 'simul' is set to 'TRUE'.

Value

- y_Gen: Generated high-frequency response series.
- X_Gen: Generated high-frequency indicator series.
- Beta_Gen: Generated coefficient vector.
- e_Gen: Generated high-frequency residual series.

References


Examples

data = TempDisaggDGP(n_l=50, m=4, p=4, method="Chow-Lin", rho=0.5)
X = data$X_Gen
Y = data$Y_Gen

Description


Usage

TempDisaggToolbox(
  Y,
  X = matrix(data = rep(1, times = nrow(Y)), nrow = nrow(Y)),
  method = "Denton-Cholette",
  aggMat = "sum",
  Denton = "first"
)
TempDisaggToolbox

Arguments

Y   The low-frequency response vector.
X   The high-frequency indicator matrix.
method   Disaggregation using 'Denton', 'Denton-Cholette', 'Chow-Lin', 'Fernandez', 'Litterman'.
aggMat   Aggregation matrix according to 'first', 'sum', 'average', 'last'.
Denton   The 'absolute', 'first', 'second' and 'proportional' difference Sigma for the Denton method.

Value

y_Est Estimated high-frequency response series.
beta_Est Estimated coefficient vector.
rho_Est Estimated residual autocorrelation parameter.
ul_Est Estimated aggregate residual series.

References


Examples

data = TempDisaggDGP(n_l=50,m=4,p=4,method='Chow-Lin',rho=0.5)
X = data$X_Gen
Y = data$Y_Gen
fit_chowlin = TempDisaggToolbox(Y=Y,X=X,method='Chow-Lin')
y_hat = fit_chowlin$y_Est
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