spINAR: : **CHEAT SHEET**

What is spINAR?

The R package spINAR was developed to simulate, estimate and bootstrap integer autoregressive (INAR) models.

Installation

Development version

> devtools::install_github("MFaymon/spINAR")

> library(spINAR)

Tutorial for spINAR

See Readme file in Github repository MFaymon/spINAR or

> help(package = "spINAR")

Arguments

- *x*: data
- *n*: sample size
- *p*: model order
- *alpha*: INAR coefficient(s)
- *pmf*: probability mass function of the innovation distribution
- *prerun*: number of additional observations *type*: estimation type (moment- or maximum likelihood-based)
- *distr*: parametric family of distributions (Poisson, geometric or negative binomial)
- *B*: number of bootstrap replicates
- *setting*: semiparametric or parametric
- *M*: upper limit for innovations
- *level*: level of confidence intervals
- *penal1* : L1 penalization parameter
- *penal2* : L2 penalization parameter
- *validation*: true or false whether validation is wanted
- *over*: indicates whether validation over penal1, penal2 or both
- *init1* : initial penal1 value
- *init2* : initial penal2 value
- *folds*: number of folds in validation

Functions

Syntax

Simulation of INAR(p) data

spinar_sim() simulates INAR data for given sample size, model order, model coefficient(s) and pmf of the innovation distribution
Output: simulated INAR data x

```
spinar_sim(n, p, alpha, pmf, prerun)
```

Semiparametric estimation of INAR(p) model

spinar_est() estimates semiparametrically an INAR model of given order p on given data
Output: estimated model parameters: alpha and pmf

```
spinar_est(x, p)
```

Parametric estimation of INAR(p) model

spinar_est_param() estimates parametrically (moment- or ML-based) and INAR model of given order p on given data for a given parametric family of distribution (Poi, Geo or NB)
Output: estimated model parameters: alpha and parameter(s) of input distribution

```
spinar_est_param(x, p, type, distr)
```

Bootstrapping INAR(p) data

spinar_boot() performs the (semi)parametric INAR bootstrap procedure for given data, model order, number of replications for a given parametric family of distribution (Poi, Geo or NB) and estimation method
Output: bootstrap observations, bootstrap estimated parameters (alpha and pmf or innovation parameters) and bootstrap confidence intervals

```
spinar_boot(x, p, B, setting, type, distr, M,
            level)
```

Penalized semiparametric estimation of INAR(p) model

spinar_penal() estimates semiparametrically and penalized an INAR model of given order and given the penalization parameters on given data
Output: penalized estimated parameters: alpha, pmf

```
spinar_penal(x, p, penal1, penal2)
```

spinar_penal_val() estimates semiparametrically and penalized an INAR model of given order and given the penalization parameter(s) on given data and allows for validation of both or only one penalization parameter
Output: penalized estimated parameters alpha, pmf and validated penalization parameter(s)

```
spinar_penal_val(x, p, validation, penal1,
                 penal2, over, folds, init1,
                 init2)
```