Package 'SemiEstimate'

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Title Solve Semi-Parametric Estimation by Implicit Profiling

Version 1.1.3

Description Semi-parametric estimation problem can be solved by two-step Newton-Raphson iteration. The implicit profiling method<arXiv:2108.07928> is an improved method of two-step NR iteration especially for the implicit-bundled type of the parametric part and non-parametric part. This package provides a function semislv() supporting the above two methods and numeric derivative approximation for unprovided Jacobian matrix.

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Encoding UTF-8

RoxygenNote 7.1.1

Suggests knitr, rmarkdown, numDeriv, purrr, rlang, testthat (>= 3.0.0), BB, nleqslv, splines2

VignetteBuilder knitr

Config/testthat/edition 3

NeedsCompilation no

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`semislv` *Solve Semi-parametric estimation by implicit profiling*

Description

Solve Semi-parametric estimation by implicit profiling

Usage

```
semislv(
  theta,
  lambda,
  Phi_fn,
  Psi_fn,
  jac = list(),
  intermediates = list(),
  method = "implicit",
  diy = FALSE,
  control = list(max_iter = 100, tol = 0.001),
  save = list(time = TRUE, path = FALSE),
  ...
)
```

Arguments

`theta`	the initial value of parametric part
`lambda`	the initial value of non-parametric part
`Phi_fn`	the equation function highly relevant to the parametric part
`Psi_fn`	the equation function highly relevant to the non-parametric part
`jac`	a list containing some of deterivate info of Phi_der_theta_fn, Psi_der_theta_fn, Phi_der_lambda_fn, Psi_der_lambda_fn,
`intermediates`	a list containing the important variables for diy mode
`method`	"implicit" or "iterative"
`diy`	a bool value to decide to parse user designed function
`control`	a list like list(max_iter = 100, tol = 1e-3) to control the early stop
`save`	a list like list(time = FALSE, path = FALSE) to control saving setting
`...`	static parameter for Phi_fn, Psi_fn. Diy execution function.

Value

A save space containing final iteration result and iteration path

Examples

```
Phi_fn <- function(theta, lambda, alpha) 2 * theta + alpha * lambda
Psi_fn <- function(theta, lambda, alpha) 2 * lambda + alpha * theta
# build quasi jacobiean by package NumDeriv
res <- semislv(1, 1, Phi_fn, Psi_fn, alpha = 1)
res <- semislv(1, 1, Phi_fn, Psi_fn, method = "iterative", alpha = 1)
# parsing all mathematical Jacobian function by user
res <- semislv(1, 1, Phi_fn, Psi_fn, jac = list(
        Phi_der_theta_fn = function(theta, lambda, alpha) 2,
        Phi_der_lambda_fn = function(theta, lambda, alpha) alpha,
        Psi_der_theta_fn = function(theta, lambda, alpha) alpha,
        Psi_der_lambda_fn = function(theta, lambda, alpha) 2
), method = "implicit", alpha = 1)
res <- semislv(1, 1, Phi_fn, Psi_fn, jac = list(
        Phi_der_theta_fn = function(theta, lambda, alpha) 2,
        Psi_der_lambda_fn = function(theta, lambda, alpha) 2
), method = "iterative", alpha = 1)
# parsing partial mathemetical user-provided Jacobian, the rest will be generated by the NumDeriv
res <- semislv(1, 1, Phi_fn, Psi_fn,
        jac = list(Phi_der_theta_fn = function(theta, lambda, alpha) 2),
        method = "implicit", alpha = 1
)
res <- semislv(1, 1, Phi_fn, Psi_fn,
        jac = list(Phi_der_theta_fn = function(theta, lambda, alpha) 2),
        method = "iterative", alpha = 1
)
# use some package or solve the updating totally by the user
# Cases: (1) use thirty party package (2) save the intermediates
# use diy = True, then the package will be just a wrapper for your personalise code
# diy is an advanced mode for researchers, see more examples in our vigettee documents
```

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