

Package ‘VarED’

January 20, 2025

Type Package

Title Variance Estimation using Difference-Based Methods

Version 1.0.0

Date 2017-03-05

Author Wenlin Dai <wenlin.dai@kaust.edu.sa>, Tiejun Tong <tongt@hkbu.edu.sa>.

Maintainer Wenlin Dai <wenlin.dai@kaust.edu.sa>

Description

Generating functions for both optimal and ordinary difference sequences, and the difference-based estimation functions.

Depends R (>= 3.3.0)

License GPL-2

NeedsCompilation no

Repository CRAN

Date/Publication 2017-03-05 09:44:46

Contents

optseq	1
ordseq	2
vardif	3

Index	4
--------------	----------

optseq	<i>Optimal Difference Sequence</i>
--------	------------------------------------

Description

Generate an optimal difference sequence with order $r(\leq 10)$.

Usage

```
optseq(r)
```

Arguments

`r` the order of the generated difference sequence.

Value

The generated optimal difference sequence.

References

Hall, P., Kay, J. W. and Titterington, D. M. (1990). Asymptotically optimal difference-based estimation of variance in nonparametric regression, *Biometrika* 77: 521 - 528.

Examples

```
r<-2  
optseq(r)
```

ordseq

Ordinary Difference Sequence

Description

Generate an ordinary difference sequence with order `r`.

Usage

```
ordseq(r)
```

Arguments

`r` the order of the generated difference sequence.

Value

The generated ordinary difference sequence.

References

Hall, P., Kay, J. W. and Titterington, D. M. (1990). Asymptotically optimal difference-based estimation of variance in nonparametric regression, *Biometrika* 77: 521 - 528.

Dette, H., Munk, A. and Wagner, T. (1998). Estimating the variance in nonparametric regression - what is a reasonable choice?, *Journal of the Royal Statistical Society, Series B* 60: 751 - 764.

Examples

```
r<-2  
ordseq(r)
```

vardif*Estimate Residual Variance with Differene-Based Method.*

Description

Estimate residual variance with differene-based method.

Usage

```
vardif(x, y, type, r, m)
```

Arguments

x	numeric Equally spaced design points.
y	numeric Responses
type	character Taking "opt" or "ord", default as "ord"
r	numeric The order of employed difference sequence.
m	numeric The bandwidth or the number of regressors.

Value

u	numeric The estimated variance.
---	---------------------------------

References

Tong, T. and Wang, Y. (2005). Estimating residual variance in nonparametric regression using least squares, *Biometrika* 92: 821 - 830.

Wenlin Dai, Tiejun Tong and Lixing Zhu (2017) Optimal sequence or ordinary sequence? A unified framework for variance estimation in nonparametric regression, *Statistical Science*.

Examples

```
x<-1:100/100  
y<-5*sin(2*pi*x)+rnorm(100)*0.5  
type="ord"  
r<-2  
m<-10  
vardif(x,y,type,r,m)
```

Index

optseq, [1](#)

ordseq, [2](#)

vardif, [3](#)