

Package ‘EW’

May 3, 2015

Type Package
Title Edgeworth Expansion
Version 1.1
Date 2015-04-28
Author H.R.Law
Maintainer H.R.Law <4islands@gmail.com>
Description Edgeworth Expansion calculation.
License GPL
NeedsCompilation no
Repository CRAN
Date/Publication 2015-05-03 07:07:26

R topics documented:

EW-package	1
EW	2
EWplot	4

Index	5
--------------	----------

EW-package	<i>Edgeworth Expansion</i>
------------	----------------------------

Description

This R-script provides a function EW which generate a polynomial function $p_j(x)$ which approximate the error term of order of $o(n^{-(j/2)})$ in F_{W_n} minus $\Phi(x)$ i.e. We can estimate how fast this standardized W_n converges to $N(0,1)$ using $\Sigma p_j(x)o(n^{-(j/2)})$ This result is called Edgeworth Expansion in modern statistical asymptotic theory. Usage: `EW(rvlist,miu,sigma,error,ord)` returns a polynomial function `p_ord`, assuming the r.v.s holds a mena of `miu` and a variance of `sigma`. `error` is the `eps` used to calculate the numerical derivation needed. `EWplot(f)_____plot` a graph showing the asymptotic manner of `p_ord`

Details

Package:	EW
Type:	Package
Title: This R-script calculates the polynomials in Edgeworth expansion up to order 2.	
Version:	1.0
Date:	2015-04-27
Author:	H.R.Law
Maintainer:	Who to complain to <4islands@gmail.com>
Description:	This R-script calculates the polynomials in Edgeworth expansion up to order 2.
License:	GPL

Author(s)

H.R.Law

References

[Jun Shao]Mathematical Statistics, revised ed, Springer:2003 P70-76, Sec1.5.6

Examples

```
data=rnorm(99,0,1)
fv=EW(data,ord=1)
EWplot(fv)
```

EW

Edgeworth Expansion

Description

Edgeworth Expansion polynomials up to order 2.

Usage

```
EW(rvlist, miu = 0, sigma = 1, e = 10^-5, ord = 1)
```

Arguments

rvlist	sample data of r.v.s which are assumed to be i.i.d
miu	the mean of r.v.s
sigma	the variance of r.v.s
e	the eps
ord	the order of polynomial, only 1 or 2 permitted.

Note

[Jun Shao]Mathematical Statistics, revised ed, Springer:2003 P70-76, Sec1.5.6

Author(s)

H.R.Law

References

[Jun Shao]Mathematical Statistics, revised ed, Springer:2003 P70-76, Sec1.5.6

Examples

```
##---- Should be DIRECTLY executable !! ----
##-- ==> Define data, use random,
##--or do help(data=index) for the standard data sets.

## The function is currently defined as
function (rvlist, miu = 0, sigma = 1, e = 10^-5, ord = 1)
{
  rvlist = as.numeric(rvlist)
  kappa <- function(t) {
    log(mgf(t, rvlist))
  }
  mgf <- function(t, rv = c()) {
    mean(exp(t %*% rv))
  }
  diff <- function(f, e = 10^-5) {
    ft <- function(x) {
      (f(x + e) - f(x - e))/(2 * e)
    }
    ft
  }
  kappa3 <- diff(diff(diff(kappa)))
  kappa4 <- diff(diff(diff(diff(kappa))))
  k3 <- kappa3(0) * 3 * 2 * 1 * e^3
  k4 <- kappa4(0) * 4 * 3 * 2 * 1 * e^4
  PhiP <- function(tkk, e = 10^-5) {
    Phi <- function(val1) {
      pnorm(val1, 0, 1)
    }
    (Phi(tkk + e) - Phi(tkk - e))/(2 * e)
  }
  p1 <- function(y) {
    (-1/6) * k3 * (y^2 - 1) * PhiP(y)
  }
  p2 <- function(y) {
    -((-1/24) * k4 * y * (y^2 - 3) + (1/72) * k3 * y * (y^4 -
      10 * y^2 + 15)) * PhiP(y)
  }
  if (ord == 1)
    p1
}
```

```
    else p2  
  }
```

EWplot

Plotting the EW polynomials

Description

Plotting the EW polynomials.

Usage

```
EWplot(f)
```

Arguments

f put the polynomial you yield from EW function here.

Author(s)

H.R.Law

Examples

```
##---- Should be DIRECTLY executable !! ----  
##-- ==> Define data, use random,  
##--or do help(data=index) for the standard data sets.  
  
## The function is currently defined as  
function (f)  
{  
  v <- seq(-5, 5, by = 0.2)  
  plot(v, f(v), font.lab = 2, type = "o")  
}
```

Index

*Topic **\textasciitildekwd1**

EW, 2

EWplot, 4

*Topic **\textasciitildekwd2**

EW, 2

EWplot, 4

*Topic **package**

EW-package, 1

EW, 2

EW-package, 1

EWplot, 4