**ROC**

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**AUC**

*functionals of ROC curve*

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**Description**

various functionals of ROC (Receiver Operating Characteristic) curves

**Usage**

```
AUC(rocobj)
AUCi(rocobj)
pAUC(rocobj,t0)
pAUCi(rocobj,t0)
```

**Arguments**

- `rocobj`: element of class rocc
- `t0`: FPR point at which TPR is evaluated or limit in (0,1) to integrate to

**Details**

AUC, pAUC, AUCi and pAUCi compute the Area Under the Curve.
AUC and pAUC employ the trapezoidal rule. AUCi and pAUCi use integrate().
AUC and AUCi compute the area under the curve from 0 to 1 on the x-axis (i.e., the 1 - specificity axis).
pAUC and pAUCi compute the are under the curve from 0 to argument t0 on the x-axis (i.e., the 1 - specificity axis).
Elements of class rocc can be created by rocdemo.sca() or other constructors you might make using the code of rocdemo.sca() as a template.

**Author(s)**

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**References**


1
See Also

rocdemo.sca

Examples

set.seed(123)
R1 <- rocdemo.sca( rbinom(40,1,.3), rnorm(40), dxrule.sca,
        caseLabel="new case", markerLabel="demo Marker" )
print(AUC(R1))
print(pAUC(R1,.3))
print(pAUCi(R1,.3))
print(ROC(R1,.3))

plot-methods

plot method for ROC curves

Description

plot method for ROC curves

Methods

x = roc  plots an ROC curve object, with additional parameters available:

show.thresh (logical): should marker threshold values be plotted?
jit (logical): should plotted points be jittered?
add (logical): increment to current plot?
line (logical): plot points or lines?
threshCex (numeric): if showing threshold values, set character expansion in text call to this value
threshYsh (numeric): if showing threshold values, add this quantity to y coordinate of curve to plot the threshold value (should be negative for printing below point)
threshDig (numeric): if showing threshold values, use this as the digits parameter to round to display the threshold
... extra parameters passed to base plot, lines or points as needed

Examples

set.seed(123)
R1 <- rocdemo.sca( rbinom(40,1,.3), rnorm(40), dxrule.sca,
        caseLabel="new case", markerLabel="demo Marker" )
plot(R1, line=TRUE, show.thresh=TRUE, lwd=2, threshDig=2)
R2 <- rocdemo.sca( rbinom(40,1,.3), rnorm(40), dxrule.sca,
        caseLabel="new case", markerLabel="demo Marker" )
plot(R2, line=TRUE, add=TRUE, col="green", lwd=2 )
R3 <- rocdemo.sca( rbinom(40,1,.4), rnorm(40), dxrule.sca,
        caseLabel="new case", markerLabel="demo Marker" )
points(R3, col="red", pch=19)
rocc-class  

Class rocc, ROC curve representation

Description

object representing ROC curve, typically created using rocdemo.sca

Creating Objects

```r
new('rocc',
sens = ...., # Object of class numeric
spec = ...., # Object of class numeric
rule = ...., # Object of class function
cuts = ...., # Object of class numeric
markerLabel = ...., # Object of class character
caseLabel = ...., # Object of class character
)
```

Slots

- **sens**: Object of class "numeric" sensitivity values
- **spec**: Object of class "numeric" specificity values
- **rule**: Object of class "function" rule to classify objects
- **cuts**: Object of class "numeric" thresholds defining curve
- **markerLabel**: Object of class "character" name of measured marker
- **caseLabel**: Object of class "character" name of condition

Methods

- **plot** (rocc, missing): a plotting function with some additional parameters

Examples

```r
set.seed(123)
R1 <- rocdemo.sca( rbinom(40,1,.3), rnorm(40), dxrule.sca,
  caseLabel="new case", markerLabel="demo Marker" )
plot( R1, show.thresh=TRUE )
```

rocdemo.sca  

function to build objects of class 'rocc'

Description

rocdemo.sca – demonstrate ‘rocc’ class construction using a scalar marker and simple functional rule
Usage

rocdemo.sca(truth, data, rule=NULL,
            cutpts=NA,
            markerLabel="unnamed marker", caseLabel="unnamed diagnosis")

Arguments

  truth       true classification of objects. Must take values 0 or 1.
  data        quantitative markers used to classify
  rule        rule: a function with arguments (x, thresh) returning 0 or 1. If no rule is pro-
               vided the standard rule dxrule.sca is assumed and a faster implementation
               utilized.
  cutpts      values of thresholds
  markerLabel textual label describing marker
  caseLabel   textual label describing classification

Details

dxrule.sca is function (x, thresh) ifelse(x > thresh, 1, 0)

The default value of argument cutpts is a point less than min(data), points separating the unique
values of data and a point greater than max(data).

Value

  an object of S4 class rocc

Author(s)

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See Also

  AUC

Examples

  set.seed(123)
  R1 <- rocdemo.sca(rbinom(40,1,.3), rnorm(40), caseLabel="new case", markerLabel="demo Marker")
  plot(R1, line=TRUE, show.thresh=TRUE)
  truth <- c(0,1,0,1,1,0,1,1)
  data  <- c(2,3,4,4,5,6,7,8)
  R2 <- rocdemo.sca(truth, data, dxrule.sca)
  plot(R2, line=TRUE, show.thresh=TRUE)
  R3 <- rocdemo.sca(truth, data, function(x, thresh) 1 - dxrule.sca(x, thresh))
  if (AUC(R2) + AUC(R3) != 1) stop('Sum of AUCs should be 1.')
trapezint

Description
trapezoidal rule for AUC

Usage
trapezint(x, y, a, b)

Arguments
x x - abscissae
y y - ordinates
a a - lower limit of integration
b b - upper limit of integration

Details
uses approx

Value
estimated AUC

Examples
x <- sort(runif(30))
y <- sin(x)
print(trapezint(x,y,0,1))
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