Package ‘ROC’

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Title utilities for ROC, with uarray focus
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R topics documented:

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AUC functionals of ROC curve

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 area 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

Duda, R. O., Hart, P. E., Stork, D. G., 2001 Pattern Classification, 2nd Ed., p. 49

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))
Methods

\( x = \text{rocc} \) 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

```r
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)
```

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

Description

`rocdemo.sca` function to build objects of class 'rocc'

Usage

```r
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 provided or the standard rule `dxrule.sca` is passed, a faster C-based implementation is used to compute sensitivity and specificity.
- **cutpts**: values of thresholds; no NA allowed, or they will be recomputed using smallest gap between data points with distinct values
- **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).
**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

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