

# Package ‘vandalico’

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**Type** Package

**Title** Evaluation of Presence-Absence Models

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**Author** Alberto Jiménez-Valverde

**Maintainer** Alberto Jiménez-Valverde <alberto.jimenez.valverde@gmail.com>

**Description** Collection of functions to evaluate presence-absence models. The main function corrects discrimination for the representativeness effect following:  
Jiménez-Valverde (2022) "The uniform AUC: dealing with the representativeness effect in presence-absence models. *Methods Ecol. Evol.*, accepted on 28 January 2022.

**License** GPL-3

**Imports** ROCR (>= 1.0-7), stats, graphics

**Depends** R (>= 3.5.0)

**RoxygenNote** 7.1.0

**Encoding** UTF-8

**NeedsCompilation** no

**Repository** CRAN

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## R topics documented:

AUCuniform . . . . .	2
CALplot . . . . .	3
<b>Index</b>	<b>5</b>

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AUCuniform

*Calculates the uniform AUC and uniform Se\**


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### Description

This function computes the uniform *AUC* (*uAUC*) and uniform *Se\** (*uSe\**) following Jiménez-Valverde (2022).

### Usage

```
AUCuniform(
  mat,
  rep = 100,
  by = 0.1,
  deleteBins = NULL,
  plot = FALSE,
  plot.adds = FALSE
)
```

### Arguments

<code>mat</code>	A matrix with two columns. The first column must contain the suitability values (i.e., the classification rule); the second column must contain the presences and absences.
<code>rep</code>	Number of sampling replications. By default, <code>rep = 100</code> .
<code>by</code>	Size of the suitability intervals (i.e., bins). By default, <code>by = 0.1</code> .
<code>deleteBins</code>	A vector (e.g., from 1 to 10 if <code>by = 0.1</code> ) with the bins that have to be excluded (1 for [0,0.1), 10 for [0.9,1]) from the resampling procedure (trimming); NULL by default.
<code>plot</code>	Logical. Indicates whether or not the observed ROC curve is plotted.
<code>plot.adds</code>	Logical. Indicates whether or not the negative diagonal and the point of equivalence are added to the observed ROC plot.

### Details

This function performs the stratified weighted bootstrap to calculate the uniform *AUC* (*uAUC*) and uniform *Se\** (*uSe\**) as suggested in Jiménez-Valverde (2022). A warning message will be shown if the sample size of any bin is zero. Another warning message will be shown if the sample size of any bin is lower than 15. In such case, trimming should be considered. The *AUC* (non-uniform) is estimated non-parametrically (Bamber 1975). *Se\** is calculated by selecting the point that minimizes the absolute difference between sensitivity and specificity and by doing the mean of those values (Jiménez-Valverde 2020).

**Value**

A list with the following elements:

AUC: the *AUC* value (non-uniform), a numeric value between 0 and 1.

Se: the *Se\** value (non-uniform), a numeric value between 0 and 1.

bins: a table with the sample size of each bin.

suit.sim: a matrix with the bootstrapped suitability values.

sp.sim: a matrix with the bootstrapped presence-absence data.

uAUC: a numeric vector with the (*uAUC*) values for each replication.

uAUC.95CI: a numeric vector with the sample (*uAUC*) quantiles corresponding to the probabilities 0.025, 0.5 and 0.975.

uSe: a numeric vector with the (*uSe\**) values for each replication.

uSe.95CI: a numeric vector with the sample (*uSe\**) quantiles corresponding to the probabilities 0.025, 0.5 and 0.975.

**References**

Bamber, D. (1975). The Area above the Ordinal Dominance Graph and the Area below the Receiver Operating Characteristic Graph. *J. Math. Psychol.*, 12, 387-415.

Jiménez-Valverde, A. (2020). Sample size for the evaluation of presence-absence models. *Ecol. Indic.*, 114, 106289.

Jiménez-Valverde, A. (2022). The uniform AUC: dealing with the representativeness effect in presence-absence models. *Methods Ecol. Evol.*, accepted on 28 January 2022.

**Examples**

```
suit<-rbeta(100, 2, 2) #Generate suitability values
random<-runif(100)
sp<-ifelse(random < suit, 1, 0) #Generate presence-absence data
result<-AUCuniform(cbind(suit, sp), plot = TRUE, plot.adds = TRUE)
result$uAUC.95CI[2] #Get the uAUC
```

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CALplot

*Calibration graph*

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**Description**

A function to plot a calibration graph.

**Usage**

```
CALplot(mat, by = 0.1)
```

**Arguments**

mat	A matrix with two columns. The first column must contain the suitability values (i.e., the classification rule); the second column must contain the presences and absences.
by	Size of the suitability intervals (bins). By default, by = 0.1.

**Details**

Dots for bins with 15 or more cases are shown in solid black; dots for bins with less than 15 cases are shown empty (see Jiménez-Valverde et al. 2013). This way, by plotting the calibration graph before running [AUCuniform](#), one can get a glimpse of how reliable  $uAUC$  or  $uSe^*$  can be expected to be.

**Value**

This function returns a calibration plot

**References**

Jiménez-Valverde, A., Acevedo, P., Barbosa, A. M., Lobo, J. M. & Real, R. (2013). Discrimination capacity in species distribution models depends on the representativeness of the environmental domain. *Global Ecol. Biogeogr.*, 22, 508-516.

**Examples**

```
suit<-rbeta(100, 2, 2) #Generate suitability values
random<-runif(100)
sp<-ifelse(random < suit,1 , 0) #Generate presence-absence data
CALplot(cbind(suit, sp))
```

# Index

AUCuniform, [2](#), [4](#)

CALplot, [3](#)