Package 'pamctdp'

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Title Principal Axes Methods for Contingency Tables with Partition
Structures on Rows and Columns

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Depends R (>= 2.7.0), ade4, xtable,FactoClass

Description Correspondence Analysis of Contingency Tables with Simple
and Double Structures Superimposed Representations, Intra
Blocks Correspondence Analysis (IBCA), Weighted Intra Blocks
Correspondence Analysis (WIBCA).

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Encoding latin1

NeedsCompilation no

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R topics documented:

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ctdp2df   *Convertion of Double Partition Contingency Table to Data Frame*

Description

It build up a data.frame containing the four factors and the frequencies associtted to a Double Partition Contingency Table

Usage

```
ctdp2df(tab,rbl,cbl,iden=rep(3,4))
```

Arguments

tab	matrix or data.frame containing the contingency table
rbl	a numeric vector indicating the row numbers for each block of rows
cbl	a numeric vector indicating the column numbers for each block of columns
iden	number of characters of each factor to paste for the row identifications

Details

A data.frame with four factors an frequency column is made

Value

Returns a data.frame containing :

J	factor identifying column partition
K	factor identifying CT columns
L	factor identifying row partition
I	factor identifying CT rows

Author(s)

Campo Elías PARDO <cepardot@unal.edu.co> http://www.docentes.unal.edu.co/cepardot

References

Pardo Campo Elías (2005). Análisis de correspondencias de tablas de contingencia estructuradas. In: Memorias del Coloquio Distrital de Matemáticas y Estadística. Volume 7. Universidad Distrital, Bogotá http://www.docentes.unal.edu.co/cepardot/docs/ColoquioDistritalMatEst/AnalCorresTCE.pdf

Examples

```
data(mores5)
attach(mores5)
ctdp2df(tab,rbl5,cbl5)
detach(mores5)
```

---

inerepa   *Associtted SCA Inertia Repartition*

Description

Associtted SCA Inertia Repartition: SCA of T total of the blocks + intra-tables CA of TJ of the column band marginals + intra-tables CA of TL of the row band marginals + ACI associatted inertia

Usage

```
inerepa(tab,rbl,cbl)
```

Arguments

tab	matrix or data.frame containing the contingency table
rbl	a numeric vector indicating the row numbers for each block of rows
cbl	a numeric vector indicating the column numbers for each block of columns

Details

Compute total inertia of four correspondence analysis

Value

Returns a numeric vector containing :

inT	column band weights
winTL	row band weights
winTJ	column band qualities of the representation
inACI	row band qualities of the representation

Author(s)

Campo Elías PARDO <cepardot@unal.edu.co> <http://www.docentes.unal.edu.co/cepardot>

References

Pardo Campo Elías (2005). Análisis de correspondencias de tablas de contingencia estructuradas. In: Memorias del Coloquio Distrital de Matemáticas y Estadística. Volume 7. Universidad Distrital, Bogotá <http://www.docentes.unal.edu.co/cepardot/docs/ColoquioDistritalMatEst/AnalCorresTCE.pdf>

Examples

```
data(ardeche)
attach(ardeche)
inerepa(tab,row.blocks,col.blocks)
detach(ardeche)
```

---

inertia.wwm	*Additional aids to interpretation of Double Intra Correspondence Analysis*

Description

Aids to interpretation associated to subclouds in Double Intra Correspondence Analysis (ICA, IBCA, ...). Square distances to the origin of rows and columns

Usage

```
      ## S3 method for class 'wwm'
inertia(x, xax=1,yax = 2,dec=1,ti=1000, ...)
      ## S3 method for class 'wwinertia'
print(x, ...)
```

Arguments

x	object of class wwmodel (in the inertia method) or wwinertia (in the print method)
xax	the axis number of x
yax	the axis number of y
dec	number of decimal digits in $fil and $col
ti	the inertia values are multiplied by ti
...	further arguments passed to or from other methods

Details

Aids to interpretation associated to the bands. There are J column bands and L row bands.

Value

Returns a list of class wwinertia containing:

cloud.col	column band weights
cloud.row	row band weights
rel.col	column band qualities of the representation
rel.row	row band qualities of the representation

`abs.col`	column band absolute contributions
`abs.row`	row band absolute contributions
`col`	a table of inertia for the column clouds. The inertia values are multiplied by ti
`row`	a table of inertia for the row clouds. The inertia values are multiplied by ti
`coraxisJ`	a data frame giving the correlations between the axis separate and global analysis for column bands
`coraxisL`	a data frame giving the correlations between the axis separate and global analysis for row bands
`dis.row`	square distances of rows to the origin
`dis.col`	square distances of columns to the origin

Author(s)

Campo Elias PARDO <cepardot@unal.edu.co>

References

Becue M., Pages J. and Pardo C.E. (2005). Contingency table with a double partition on rows and columns. Visualization and comparison of the partial and global structures. In: Proceedings ASMDA, Brest, France. May,17-20, 2005. Eds: Jacques Janssen and Philippe Lenca. ENST Bretagne. pages 355–364. http://conferences.telecom-bretagne.eu/asmda2005/IMG/pdf/proceedings/355.pdf

Cazes, P., Chessel, D. and Doledec, S. (1988) L'analyse des correspondances internes d'un tableau partitionn? : son usage en hydrobiologie. Revue de Statistique Appliquee, 36, 39–54.

Pardo Campo Elias (2005). Analisis de correspondencias de tablas de contingencia estructuradas. In: Memorias del Coloquio Distrital de Matematicas y Estadistica. Volume 7. Universidad Distrital, Bogota http://www.docentes.unal.edu.co/cepardot/docs/ColoquioDistritalMatEst/AnalCorresTCE.pdf

Examples

```
data(ardeche)
# change column names
names(ardeche$tab) <- paste(ardeche$sta.fac,ardeche$dat.fac,sep="")
rownames(ardeche$tab) <- # change row names
paste(strtrim(rownames(ardeche$tab),1),substr(rownames(ardeche$tab),4,
length(rownames(ardeche$tab))),sep="")
coa1 <- dudi.coa(ardeche$tab, scann = FALSE, nf = 4)
ww <- witwit.model(coa1, ardeche$row.blocks, ardeche$col.blocks, scann = FALSE)
aids <- inertia(ww)
aids$col
aids$row
```

---

mores   *Mortality Data in Spain*

Description

Structured Contingency Table: in rows years (1995, 2005) by regions(17); in columns sex by age by causes

Usage

```
data(mores)
```

Format

mores is a list with 6 components.

tab is a data frame containing mortality table with 34 rows and 55 columns.

SexAgeCause mnemonic label to the column in Spanish and English.

community mnemonic label to the communities in Spanish and English.

develop is a data frame containing gross value per capita, percentage of illiterate people and percentage of unemployed in the active population

rbl is a vector containing the repartition of regions for the two years: 1995, 2005.

cbl is a vector containing the repartition of causes for the 4 groups: male premature mortality, male no premature mortality, female premature mortality, female no premature mortality.

rblfac is a factor for rows (2 years).

cblfac is a factor for columns (4 groups).

SpaDev Spanish labels of the three development indicators.

Source

Eurostat and INE of España

References

Becue, M. and Pages, J. (2004). A principal axes method for comparing multiple contingency tables: MFACT Comp. Statistics & Data Analysis. 45(3): 481-503

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mores5	*Reduced No Premature Mortality Data in Spain*

Description

Structured Contingency Table build up with the most frequency causes (5) and the greatest regions (5) frome data `mores`

Usage

```
data(mores5)
```

Format

`mores5` is a list with components.

tab is a data frame containing mortality table with 10 rows and 10 columns.

cbl is a vector containing the repartition of causes for the 2 sex: male no premature mortality, female no premature mortality.

rbl is a vector containing the repartition of regions for the two years: 1995, 2005.

cblfac is a factor for columns (2 sex).

rblfac is a factor for rows (2 years).

Source

Eurostat

References

Buitrago, D. C. (2008). Complementariedad entre el modelo log-lineal y el analisis de correspondencias en el analisis de tablas de contingencia. Trabajo de grado para optar al titulo de Estadistica. Universidad Nacional de Colombia. Bogota. http://www.docentes.unal.edu.co/cepardot/docs/TrabajosGrado/TrabajoGradoDianaBuitrago.pdf

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multilingual	*Multilingual Free Responses Data*

Description

The data are extracted from a large international survey (Hayashi et al., 1992). People from four countries (Great Britain, France, Italy, Japan) are asked several closed questions and, moreover, the open-ended question: "What is the most important thing to you in life?" is considered. The Japanese an- swers are romanized. In each country, the free answers are grouped into 18 category-documents by crossing gender (male, female), age (into three categories: 18-34, 35-54, 55 and over) and educational level (into three categories: low, medium and high). Then, for each country, from the count of words in the whole answers, the lexical table arises by crossing the 18 documents and the most frequent words. Only the words used at least 20 times are kept.

Usage

```
data(multilingual)
```

Format

`multilingual` is a list with components.

tab is a data frame containing frequency table: 18 rows (categorical variable = gender x age x educational level)

rbl is a vector containing the repartition of words for the 4 countries

tab3 concatenation of three frequency tables (gender, age, educational level)

cbl3 is a vector containing the category numbers in each table

Source

Hayashi et al.,1992. We thank Profesor Lebart to put at our disposal this data set.

References

M. Becue and J. Pages and C.E. Pardo (2004). Analysis of cross-language open-ended questions through MFACT, in: Classification, Clustering, and Data Mining Applications. Editors-David Banks,Leanna House, Frederick R. McMorris, Phipps Arabie and Wlfgang Gaul. Heidelberg. pringer". pages 553-561. The 2004 Meeting of the International Federation of Classification Societies. Illinois Institute of Technology in Chicago, 15-18 July 2004 See in `directory:` `BecuePagesPardo04.pdf`.

Examples

```
# MFACT with pamctdp functions
data(multilingual)
# simple correspondence analysis
sca <- dudi.coa(multilingual$tab,scannf=FALSE,nf=2)
# MFACT analysis
mfact <- witwit.model(sca,multilingual$rbl,18,weight="mfa",scannf=FALSE,nf=2)
inertia(mfact)$row
# MFACT = ACIBP*homotecia
wibca2mfa(mfact)
# plot of texts
plot(mfact,Trow=FALSE,cframe=0.5)
# plot of words with representation quality on the first plan >= 40%
dev.new()
plot(mfact,ucal=40,all.point=FALSE)
# partial coordinates
parmfact <- partial.wwm(mfact)
#superimposed representation of categorias with age between 35 and 54
#1. points selection
age2 <- names(multilingual$tab)[substr( names(multilingual$tab),3,4)=="35"]
#2. new graphics window
dev.new(width=6,height=8)
#3. superimposed representation
```

```
# clic in global points and clic in the top to finish
# plot(parmfact,graph="cols",coleti=age2)
```

---

partial.wwm	*Coordinates and Aids to Interpretation of Superimposed Representation of Double Intra Correspondence Analysis*

Description

Coordinates and Aids to Interpretation of Superimposed Representation of Double Intra Correspondence Analysis

Usage

```
partial.wwm(ACww,dil = TRUE)
## S3 method for class 'parwwm'
print(x, ...)
"wwm.util.addfactor<-"(x,value)
```

Arguments

ACww	an object of class wwmodel
dil	when dil=TRUE the partial column coordinates are multiplied by the inve of the column band weight and the partial column coordinates are multiplied by the inverse of the column band weight but it is FALSE the multipliers are J and L
x	object of type parwwm
...	further arguments passed to or from other methods
value	list: rbl,cbl,nr,nc

Details

function 'wwm.util.addfactor<-' is used by 'partial.wwm' function

Value

comp1	Description of 'comp1'
comp2	Description of 'comp2'
dil	dilation T/F
nf	integer, number of kept axes
lw	row weights, a vector with I components
cw	column weights, a vector with K components
row.coor	partial row coordinates

col.coor	partial column coordinates
row.rel	quality of the representation of the partial rows
col.rel	quality of the representation of the partial columns
row.cwit	contribution to the intra inertia of the partial rows
row.cwitS	contribution to the intra inertia of the partial rows on the S subspace
col.cwit	contribution to the intra inertia of the partial columns
col.cwitS	contribution to the intra inertia of the partial columns on the S subspace
row.wit	intra inertia of the rows
row.witS	intra inertia of the rows on the S subspace
col.wit	intra inertia of the columns
col.witS	intra inertia of the columns on the S subspace
quaj	quality of the representation of the partial row clouds (J)
qual	quality of the representation of the partial colum clouds (L)
betj	intra inertia/total inertia of the whole partial row clouds on the axis
betjS	intra inertia/total inertia of the whole partial row clouds on the S subspace
betl	intra inertia/total inertia of the whole partial column clouds on the axis
betlS	intra inertia/total inertia of the whole partial column clouds on the S subspace
inLJ	cotribution to the inertia of blocks (l,j)
cancorj	cannonical correlation of the partial row clouds
cancorl	cannonical correlation of the partial column clouds
parwwm	an object of class parwwm
x	an object of class parwwm
value	list: rbl,cbl,nr,nc

Author(s)

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References

Becue M., Pagès J. and Pardo C.E. (2005). Contingency table with a double partition on rows and columns. Visualization and comparison of the partial and global structures. In: Proceedings ASMDA, Brest, France. May,17-20, 2005. Eds: Jacques Janssen and Philippe Lenca. ENST Bretagne. pages 355–364. http://conferences.telecom-bretagne.eu/asmda2005/IMG/pdf/proceedings/355.pdf

Pages, J. (2004) Multiple Factor Analysis: Main Features and Application to Sensory Data. Revista Colombiana de Estadística. **27**(1) 1–26

Examples

```
data(ardeche)
# change column names
names(ardeche$tab) <- paste(ardeche$sta.fac,ardeche$dat.fac,sep="")
rownames(ardeche$tab) <- # change row names
paste(strtrim(rownames(ardeche$tab),1),substr(rownames(ardeche$tab),4,
length(rownames(ardeche$tab))),sep="")
coa <- dudi.coa(ardeche$tab, scann = FALSE, nf = 4)
ww <- witwit.model(coa, ardeche$row.blocks, ardeche$col.blocks, scannf = FALSE)
parica <- partial.wwm(ww)
parica
```

| plot.parwwm | *Superimposed Representacion on Factorial Planes from Objects of Class parwwm* |

Description

It plots partial points in factorial planes from objects of class parwwm. We select each global point with a clic. With a clic on the top of the graphic the selection is stopped

Usage

```
## S3 method for class 'parwwm'
plot(x,xy=c(1,2),graph="rows",namesg=NULL,
                        xlim=NULL,ylim=NULL,main=NULL,
                        rotx=FALSE,roty=FALSE,roweti=row.names(dudi$li),
                        coleti=row.names(dudi$co),axislabel=TRUE,asp=1,
grid=TRUE,col.row="black",col.col="black",
cex=0.8,cex.row=0.8,cex.col=0.8,cframe=1.2,
cex.global=1,col.own= c("darkred","darkgreen" ,
"darkblue", "darkmagenta","red",
"darkorange","green3",palette()),...)
```

Arguments

x	object of type parwwm
xy	a length 2 vector specifying the components to plot
graph	select "rows" or "colums"
namesg	group names
xlim	the x limits (x1, x2) of the plot
ylim	the y limits of the plot
main	graphic title
rotx	TRUE if you want change the sign of the horizontal coordinates. Default FALSE
roty	TRUE if you want change the sign of the vertical coordinates. Default FALSE

roweti	selected row points for the graphic. Default all points
coleti	selected column points for the graphic. Default all points
axislabel	if it is TRUE the axis information is written
asp	the y/x aspect ratio, see 'plot.window'
grid	if it is TRUE a grid is plotted
col.row	color for row points and row labels. Default "black"
col.col	color for column points and column labels. Default "black"
cex	global scale for the labels. Default cex=0.8
cex.row	scale for row points and row labels. Default cex.row=0.8
cex.col	scale for column points and column labels. Default cex.col=0.8
cframe	scale for graphic limits
cex.global	scale for the label sizes
col.own	the colors used to draw the partial points by groups
...	further arguments passed to or from other methods

Details

Draw a factorial plane with the partial points and the centers of gravity. The graph is interactive and clicking on a point will draw the partial points, if you click on a point for which the partial points are yet drawn, the partial points are deleted. To stop the interactive plot, click in the top of the graph)

Value

Returns a list containing:

global	global coordinates
partial	partial coordinates of selected global points
xlim	the ended value of xlim
ylim	the ended value of ylim

Author(s)

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Examples

```
data(ardeche)
ca <- dudi.coa(ardeche$tab,scannf=FALSE,nf=4)
# FactoMineR style
plot.dudi(ca,ucal=40,all.point=FALSE,main="SCA of Ardeche, First Factorial Plane")
dev.new()
# ade4 style
plot.dudi(ca,xy=c(3,4),ucal=20,all.point=FALSE,infaxes="in",main="SCA of
Ardeche, Plane 3-4")
```

---

wibca2mfa	*MFA aids to interpretation of Weighted Intra Blocks Correspondence Analysis Lg function computes the COVV between two operators*

Description

Aids to interpretation WIBCA like two MFACT and Lg

Usage

```
wibca2mfa(ACww)
Lg(Xj,Mj,D=diag(nrow(Xj))/nrow(Xj),Xk=Xj,Mk=Mj)
```

Arguments

ACww	object of class: `wwmodel`
Xj	the first data matrix
Mj	the metric matrix associatted to Xj
D	the diagonal matrix with the row weights
Xk	the second data matrix
Mk	the metric matrix associatted to Xk

Details

Aids to interpretation associated to the bands of WIBCA like two MFA.

Value

Returns a list containing:

colb	WIBCA like column bands MFA
colb$eig	eigenvalues of column bands MFA
colb$Lg	Lg of column bands MFA
colb$RV	RV of column bands MFA
rowb	WIBCA like row bands MFA
rowb$eig	eigenvalues of row bands MFA
rowb$Lg	Lg of row bands MFA
rowb$RV	RV of row bands MFA
Lg	Lg betwenn two operators

Author(s)

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References

Pardo Campo Elías (2005). Análisis de correspondencias de tablas de contingencia estructuradas. In: Memorias del Coloquio Distrital de Matemáticas y Estadística. Volume 7. Universidad Distrital, Bogotá http://www.docentes.unal.edu.co/cepardot/docs/ColoquioDistritalMatEst/AnalCorresTCE.pdf

Examples

```
data(mores5)
coa <- dudi.coa(mores5$tab, scann = FALSE, nf = 4)
wibca <- witwit.model(coa, mores5$rbl5, mores5$cbl5, model="B",weight="mfa",scann = FALSE,nf=4)
mfa <- wibca2mfa(wibca)
mfa
```

---

witwit.model   *Within Correspondence Analysis using divers Models and Weights*

Description

`witwit.model` performs an Double Within Tables Correspondence Analysis. Modification of witwit.coa of ade4 to allow Intra Block Model and divers weights

Usage

```
witwit.model(dudi, row.blocks, col.blocks, pfil = dudi$lw, pcol = dudi$cw,
    model = "C", weight = "coa", scannf = TRUE, nf = 2,eps=1e-15,iter=100)
## S3 method for class 'wwmodel'
summary(object, ...)
## S3 method for class 'wwmodel'
print(x, ...)
```

Arguments

dudi	an object of class coa
row.blocks	a numeric vector indicating the row numbers for each block of rows
col.blocks	a numeric vector indicating the column numbers for each block of columns
scannf	a logical value indicating whether the eigenvalues bar plot should be displayed
nf	if scannf FALSE, an integer indicating the number of kept axes
pfil	a numeric vector indicating the row weights
pcol	a numeric vector indicating the column weights
model	"C": the same model of ICA,"B": intra blocks independence model
weight	c("coa": the same row and columns weights than CA, "mfa": MFA-like weights in rows and columns, "mafc": MFA-like weights in columns, "mfar": MFA-like weights in rows

eps	convergence error if weight="mfa"
iter	maximum itection number if if weight="mfa"
object	an object of class wwmodel
x	an object of class wwmodel
...	further arguments passed to or from other methods

Details

This function is build up with witwit.coa of ade4, in order to allow diferents weights and models in a contingency table with double structure of partition. If model="C" and weight="coa" the results are the same of witwit.coa. If model="B" and weight="coa" a Intra-Blocks Correspondence Analysis (IBCA) is buld up If model="B" and weight="mfa" a Weighted Intra-Blocks Correspondence Analysis (WIBCA) is build up

Value

Returns a list of class wwmodel containing:

tab	a data frame with I rows and K columns
cw	column weights, a vector with K components
lw	row weights, a vector with I components
eig	eigenvalues, a vector with min(I,K) components
nf	integer, number of kept axes
c1	principal axes, data frame with I rows and nf columns
l1	principal components, data frame with I rows and nf columns
co	column coordinates, data frame with K rows and nf columns
li	row coordinates, data frame with I rows and nf columns
call	original call
rbvar	a data frame with the within variances of the rows of the factorial coordinates
lbw	a data frame with the marginal weighting of the row bands
cvar	a data frame with the within variances of the columns of the factorial coordinates
cbw	a data frame with the marginal weighting of the column bands
hom	homotecia to read some aids as in MFA
rbl	number of rows in each row-band
cbl	number of columns in each column-band
sepeig.col	band-column separate firt eigenvalues if weight="mfa"
sepeig.row	band-row separate firt eigenvalues if weight="mfa"

Author(s)

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References

Becue M., Pages J. and Pardo C.E. (2005). Contingency table with a double partition on rows and columns. Visualization and comparison of the partial and global structures. In: Proceedings ASMDA, Brest, France. May,17-20, 2005. Eds: Jacques Janssen and Philippe Lenca. ENST Bretagne. pages 355–364. `http://conferences.telecom-bretagne.eu/asmda2005/IMG/pdf/proceedings/355.pdf`

Cazes, P., Chessel, D. and Doledec, S. (1988) L'analyse des correspondances internes d'un tableau partitionne : son usage en hydrobiologie. Revue de Statistique Appliquee, 36, 39–54. `http://archive.numdam.org/ARCHIVE/RSA/RSA_1988__36_1/RSA_1988__36_1_39_0/RSA_1988__36_1_39_0.pdf`

Pardo, Campo Elías, Mónica Bécue-Bertaut, and Jorge Eduardo Ortiz. (2013). Correspondence Analysis of Contingency Tables with Subpartitions on Rows and Columns. Revista Colombiana de Estadística 36.1: 115–144.

Examples

```
data(ardeche)
# change column names
names(ardeche$tab) <- paste(ardeche$sta.fac,ardeche$dat.fac,sep="")
rownames(ardeche$tab) <- # change row names
paste(strtrim(rownames(ardeche$tab),1),substr(rownames(ardeche$tab),4,
length(rownames(ardeche$tab))),sep="")
coa1 <- dudi.coa(ardeche$tab, scannf = FALSE, nf = 4)
ww <- witwit.model(coa1, ardeche$row.blocks, ardeche$col.blocks, scann = FALSE)
ww
plot(ww)
summary(ww)
```

---

wwinertia.ord	*Sorting of Rows and Columns by Intra Inertia in Double Intra Correspondence Analysis*

Description

Rows or colums are sorted by their intra inertia. The rows or columns with the greatest and the least intra inertia are printed. The same output is printed for the intra inertia contribution of the partial rows or columns

Usage

```
wwinertia.ord(parti,ax=0,coro="row",pato="tot",can=5,dec=1)
```

Arguments

parti	an object of class parwwm
ax	number of the axis, if ax=0 the subespecie intra inertias are used
coro	within inertias for "row"s or "col"umns

pato	"tot"al or "par"tial within inertias
can	the can rows with the greatest intra inertias and the can rows with the least within inertias are printed
dec	number of decimals in the outputs

Details

when ax=0 the within inertias are calculed in the subspace of nf dimension

Author(s)

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Examples

```
# ICA of Ardeche using witwit.model
data(ardeche)
# change column names
names(ardeche$tab) <- paste(ardeche$sta.fac,ardeche$dat.fac,sep="")
rownames(ardeche$tab) <- # change row names
paste(strtrim(rownames(ardeche$tab),1),substr(rownames(ardeche$tab),4,
length(rownames(ardeche$tab))),sep="")
coa <- dudi.coa(ardeche$tab, scann = FALSE, nf = 4)
ica <- witwit.model(coa,ardeche$row.blocks,ardeche$col.blocks,scannf=FALSE,nf=4)
parica <- partial.wwm(ica)
wwinertia.ord(parica,ax=1)
```

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