***Plot latents***

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*Adding latents as lines to data cloud*. The macros show on scatterplot of data their principal components or discriminants – in a form of lines tiled with points, these latents’ scores.

# MACRO !KO\_PLOTPC: SHOWING PRINCIPAL COMPONENTS ON DATA SCATTERPLOT

Version 1, July 2011. Tested on SPSS Statistics 13, 15, 17.

!KO\_plotpc vars= *v1 v2* /\*Two or three quantitative variables with data, name-by-name list

/center= NO /\*Pass the components through cloud’s centre (YES, default) or through point 0 (NO).

Minimal specification VARS.

The macro is engaged in that it computes coordinates of principal component scores of data on the data scatterplot. These coordinates are used to display the principal components on the data scatterplot as straight lines (“axes”) tiled by points which represent principal component scores. Therefore, the macro draws, adds to the data cloud, principal components as straight lines consisting of markers.

The macro takes 2- or 3-variate quantitative data (missing values are not allowed in the data) and returns them in a new dataset together with the computed coordinates of component scores, and shows them – the data cloud and the components – on a scatterplot in Output Viewer. All the principal components are shown on the plot, i.e., as many as there are input variables. The user can remove some components from the graph if wishes so – either editing the graph or plotting their own graph: the macro has saved into the output dataset all the necessary values to plot a graph.

In order the graph not to be distorted, open to edit it and set the same scale (width of range from min to max) to all the axes. Principal components, as lines on the plot, are mutually perpendicular.

***Subcommands***

**VARS**

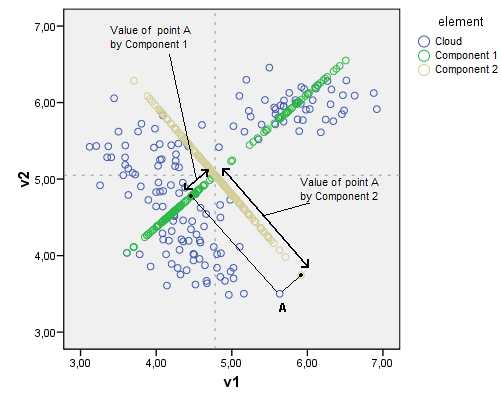
Name-by-name list of two or three quantitative variables defining axes (dimensions) of the data scatterplot. Names – up to 8 bytes long. If variables are of different measurement units, there is the sense first to standardize or uniscale them.

**CENTER**

By default/unspecifying and with CENTER=YES, principal components will have their origin in the centroid (mean) of the data cloud. With CENTER=NO, they will have their origin in the coordinates point 0. If input data are centered, i.e., means in the variables equal zero, CENTER=YES and CENTER=NO will yield same result.

EXAMPLE 1.

!KO\_plotpc vars= v1 v2.



* With 2-dimensional cloud (variables *V1* and *V2*), principal component analysis is done, computing raw (unstandardized) component scores, or component values. A component value on the picture – is the coordinate (projection) of a data point onto the component-as-axis. The macro vizualized components-axes on the scatterplot of the data; these straight lines are tiled with component values as points-markers.

***Special regimes***

The macro does not obey weighting and is not suited for the split state of the dataset. The macro obeys commands selecting cases (SELECT IF, FILTER, USE). It obeys temporary (standing under TEMPORARY) operations.

# MACRO !KO\_PLOTDIS: SHOWING DISCRIMINANTS ON DATA SCATTERPLOT

# Version 1, July 2011. Tested on SPSS 13, 15, 17.

!KO\_plotdis vars= *v1 v2* /\*Two or three quantitative variables with data, name-by-name list

/grvar= *cluster* /\*Grouping variable.

Minimal specification VARS, GRVAR.

The macro is engaged in that it computes coordinates of linear discriminant function scores on the data scatterplot. By these coordinates the discriminants, differentiating the groups which partition the data, are displayed on the data scatterplot as straight lines (“axes”) tiled by points which represent discriminant scores. Therefore, the macro draws, adds to the data cloud, discriminants as straight lines consisting of markers.

The macro takes 2- or 3-variate quantitative data (missing values are not allowed in the data) consisting of two or more groups, and returns them in a new dataset together with the computed coordinates of discriminant scores, and shows them – the data cloud and the discriminants – on a scatterplot in Output Viewer. All the discriminants are shown on the plot: number of discriminants is always min(num\_of\_groups-1, num\_of \_variables). The user can remove some discriminants from the graph if wishes so – either editing the graph or plotting their own graph: the macro has saved into the output dataset all the necessary values to plot a graph.

In order the graph not to be distorted, open to edit it and set the same scale (width of range from min to max) to all the axes. Discriminants, as lines on the plot, are not necessarily mutually perpendicular (although discriminant scores as variables don’t correlate with each other). Discriminants as lines have their origin in the data centroid.

***Subcommands***

**VARS**

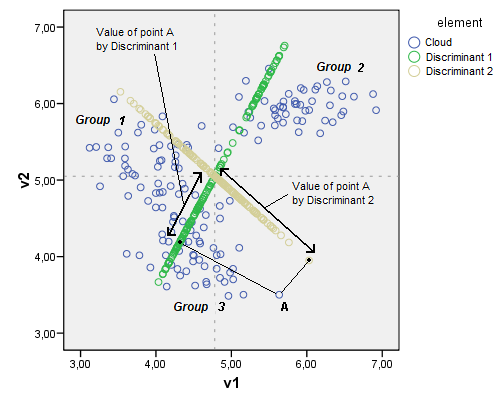
Name-by-name list of two or three quantitative variables defining axes (dimensions) of the data scatterplot. Names – up to 8 bytes long. If variables are of different measurement units, there is the sense first to standardize or uniscale them.

**GRVAR**

Grouping categorical variable. Codes in it can be any, except value: -999. Minimal number of groups is two. Variable name – up to 8 bytes.

EXAMPLE 1. The same data used as in EXAMPLE 1 of macro !KO\_PLOTPC. The data consist of three groups – in this instance, clusters.

!KO\_plotdis vars= v1 v2 /grvar= cluster.



* With 2-dimensional cloud (variables *V1* and *V2*), discriminant analysis is done, computing raw (unstandardized) discriminant scores, or discriminant values. A discriminant value on the picture – is the perpendicular coordinate (projection) of a data point onto the discriminant-as-axis. The macro vizualized discriminants-axes (in thes case they are two) on the scatterplot of the data; these straight lines are tiled with discriminant values as points-markers.

***Special regimes***

The macro does not obey weighting and is not suited for the split state of the dataset. The macro obeys commands selecting cases (SELECT IF, FILTER, USE). It obeys temporary (standing under TEMPORARY) operations.