LABORATORIO 2 DE ANÁLISIS DE CORRESPONDENCIAS

Consiste de cuatro variables categórica nominales que son registradas en doce observaciones. Las categorías incluidas en cada variable son:

Género: dos categorías (masculino, femenino)
Edad: tres categorías (joven, mayor, adulto)
Estado civil: dos categorías (soltero, casado)
Color del pelo: cuatro categorías (claro, castaño, negro, rojizo)

Las mediciones en el siguiente resumen.

Lista de 12 observaciones y sus categorias en cuatro variables				
Obs.	Género	Edad	Estado civil	Color pelo
1	M	joven	soltero	castaño
2	M	adulto	soltero	rojizo
3	F	mayor	casado	claro
4	M	adulto	soltero	negro
5	F	mayor	casado	negro
6	F	mayor	soltero	castaño
7	M	joven	casado	rojizo
8	M	adulto	casado	claro
9	M	mayor	soltero	castaño
10	F	joven	casado	negro
11	F	adulto	soltero	castaño
12	M	joven	casado	claro

Las variables y las observaciones fueron registradas en una matriz donde cada fila representa una observación con todas las repuestas en ceros y unos. Cada variable genera tantas columnas cuantas categorías incluya. Las categorías observadas por cada observación son registradas con 1 la que corresponda y 0 las que no. El resultado es la tabla G que sigue.

Obs.	Género		Edad			Edo. civil		Color pelo			
1	1	0	1	0	0	1	0	0	1	0	0
2	1	0	0	0	1	1	0	0	0	0	1
3	0	1	0	1	0	0	1	1	0	0	0
4	1	0	0	0	1	1	0	0	0	1	0
5	0	1	0	1	0	0	1	0	0	1	0
6	0	1	0	1	0	1	0	0	1	0	0
7	1	0	1	0	0	0	1	0	0	0	1
8	1	0	0	0	1	0	1	1	0	0	0
9	1	0	0	1	0	1	0	0	1	0	0
10	0	1	1	0	0	1	0	0	1	0	0
11	0	1	0	0	1	0	1	1	0	0	0
12	1	0	1	0	0	0	1	1	0	0	0

El resultado de multiplicar la transpuesta de G por su original es una matriz simétrica cuadrada cuyo orden es el máximo de categorías incluidas en todas las variables. Es decir, G´*G incluirá una diagonal principal en bloques en los que se consolida la frecuencia de cada variable y, a los lados de la diagonal de bloques, las tablas cruzadas por cada par de variables.

La matriz conocida como matriz de Burt, se muestra a continuación.

MATRIZ DE BURT (G'G)												
Género	M	7	0	3	1	3	4	3	2	2	1	2
	F	0	5	1	3	1	2	3	2	2	1	0
Edad	J	3	1	4	0	0	2	2	1	2	0	1
	M	1	3	0	4	0	2	2	1	2	1	0
	A	3	1	0	0	4	2	2	2	0	1	1
Edo. civil	S	4	2	2	2	2	6	0	0	4	1	1
	C	3	3	2	2	2	0	6	4	0	1	1
Color pelo	Cl	2	2	1	1	2	0	4	4	0	0	0
	Cst	2	2	2	2	0	4	0	0	4	0	0
	N	1	1	0	1	1	1	1	0	0	2	0
	R	2	0	1	0	1	1	1	0	0	0	2

Esta matriz es el armazón principal para poder evaluar un análisis de correspondencia múltiple y su limitante será la capacidad operativa para resolver el problema matricial.

A tal efecto utilizaremos nuevamente la función mcorran2, de MATLAB, preparada para representar gráficamente las asociaciones.

Para las coordenadas y hallar la métrica correspondiente usaremos esta **function mcorran2(X),** desarrollada para Mathworks por Trujillo-Ortiz, Méjico

Algunos comentarios, al igual que en el ejercicio anterior, no forman parte de los resultados de la función. Fueron incluidos posteriormente para dar breves explicaciones y están señalados en letra cursiva.

```
>> diary BURT
>> load analcorr.txt
% Matriz de ceros y unos
>> analcorr
analcorr =
```

```
    1    1    0    1    0    0    1    0    0    1    0    0
    2    1    0    0    0    1    1    0    0    0    0    1
    3    0    1    0    1    0    0    1    1    0    0    0
    4    1    0    0    0    1    1    0    0    0    1    0
    5    0    1    0    1    0    0    1    0    0    1    0
    6    0    1    0    1    0    1    0    0    1    0    0
    7    1    0    1    0    0    0    1    0    0    0    1
    8    1    0    0    0    1    0    1    1    0    0    0
    9    1    0    0    1    0    1    0    0    1    0    0
   10    0    1    1    0    0    1    0    0    1    0    0
   11    0    1    0    0    1    0    1    1    0    0    0
   12    1    0    1    0    0    0    1    1    0    0    0
% En el paso previo se leyó la matriz de unos y ceros para este ejemplo
% eliminamos la primera columna que es un indicador de observaciones
%
>> B=[analcorr(:,2:12)]
>> B
B =
    1    0    1    0    0    1    0    0    1    0    0
    1    0    0    0    1    1    0    0    0    0    1
    0    1    0    1    0    0    1    1    0    0    0
    1    0    0    0    1    1    0    0    0    1    0
    0    1    0    1    0    0    1    0    0    1    0
    0    1    0    1    0    1    0    0    1    0    0
    1    0    1    0    0    0    1    0    0    0    1
    1    0    0    0    1    0    1    1    0    0    0
    1    0    0    1    0    1    0    0    1    0    0
    0    1    1    0    0    1    0    0    1    0    0
    0    1    0    0    1    0    1    1    0    0    0
    1    0    1    0    0    0    1    1    0    0    0

>> %
% Hallamos la matriz de Burt
%
```

```
>> X=B'*B
X =
    7    0    3    1    3    4    3    2    2    1    2
    0    5    1    3    1    2    3    2    2    1    0
    3    1    4    0    0    2    2    1    2    0    1
    1    3    0    4    0    2    2    1    2    1    0
    3    1    0    0    4    2    2    2    0    1    1
    4    2    2    2    2    6    0    0    4    1    1
    3    3    2    2    2    0    6    4    0    1    1
    2    2    1    1    2    0    4    4    0    0    0
    2    2    2    2    0    4    0    0    4    0    0
    1    1    0    1    1    1    1    0    0    2    0
    2    0    1    0    1    1    1    0    0    0    2
>> % métrica y gráficas de ACM
%
% Iniciamos la función, donde X es la matriz de Burt
%
>> mcorran2(X)
Give me the vector of categories of each variable. Please, use [ ]: [2 3 2 4]
 Inertias of the Multiple Correspondence Analysis
for the Burt matrix given.
----------------------------------------
 Eigenvalue    Percent     Cummulative
               (Inertia)    Percent
----------------------------------------
   0.2333       37.77        37.77
   0.2032       32.90        70.67
   0.1000       16.18        86.85
   0.0384        6.22        93.07
   0.0281        4.55        97.62
   0.0144        2.33        99.96
   0.0003        0.04       100.00
----------------------------------------
```

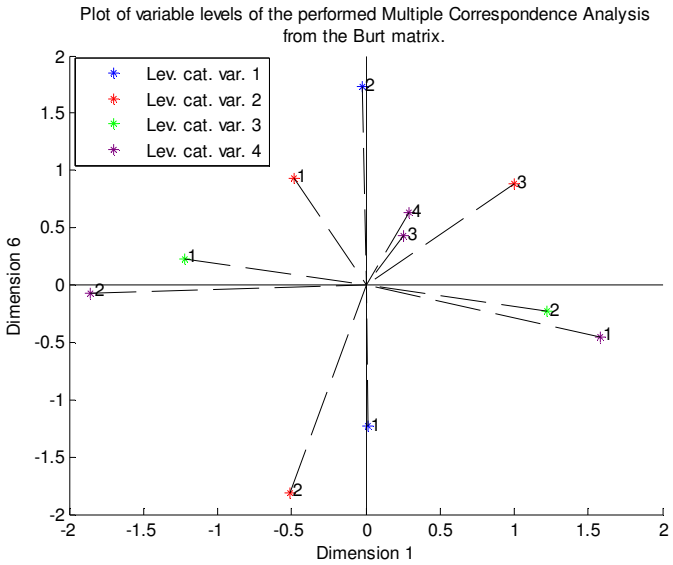
```
  Total        100.00
Variable categories = 2  3  2  4
----------------------------------------
 Adjusted inertias of the Multiple Correspondence
Analysis for the Burt matrix given.
----------------------------------------
 Eigenvalue     Percent     Cummulative
                (Inertia)     Percent
----------------------------------------
  0.09653       40.17        40.17
  0.07168       29.83        70.01
  0.00778        3.24       73.25
----------------------------------------
  Total         73.25
Variable categories = 2  3  2  4
----------------------------------------
```

% A este punto se obtiene los autovalores que al ser multiplicados
% Luego las asociaciones. Veamos las posibles combinaciones.

```
 Are you interested to get the dimensions plots? (y/n): y
--------------
The pair-wise plots you can get are: 21
--------------
Dm =
    1     2
    1     3
    1     4
    1     5
    1     6
    1     7
    2     3
    2     4
    2     5
    2     6
    2     7
```

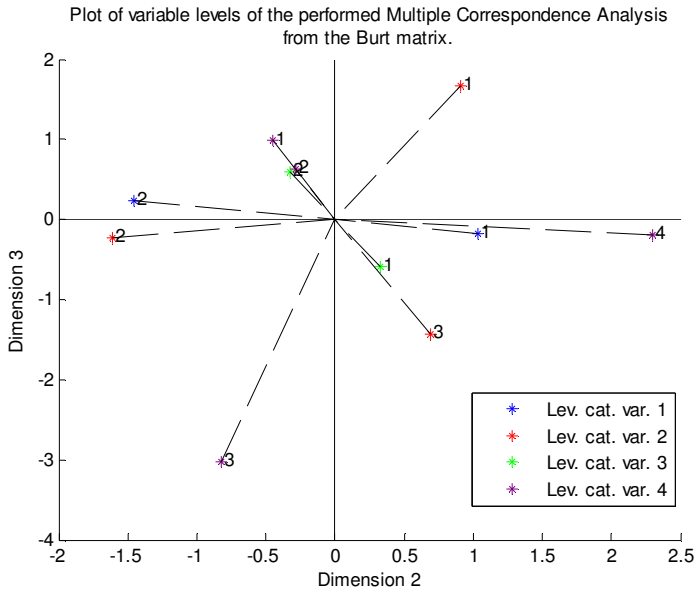
3 4
3 5
3 6
3 7
4 5
4 6
4 7
5 6
5 7
6 7

Give me the interested dimensions to plot. Please, use [a b]:[**1 6**]
Are you interested to plot the origin reference of the variable levels? (y/n): **y**
Note: At the end of the program execution. If you are interested to fit the variable labels on the generated figures you can turn-on active button 'Edit Plot', do click on the selected label and drag to fix it on the desired position. Then turn-off active 'Edit Plot'.
Are you interested to plot the origin quadrature? (y/n): **y**

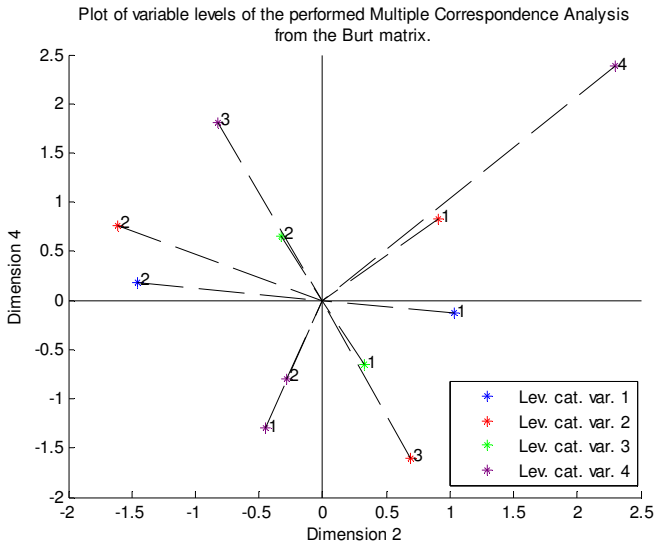


Do you need another plot? (y/n):**y**
Give me the interested dimensions to plot. Please, use [a b]:[**2 3**]

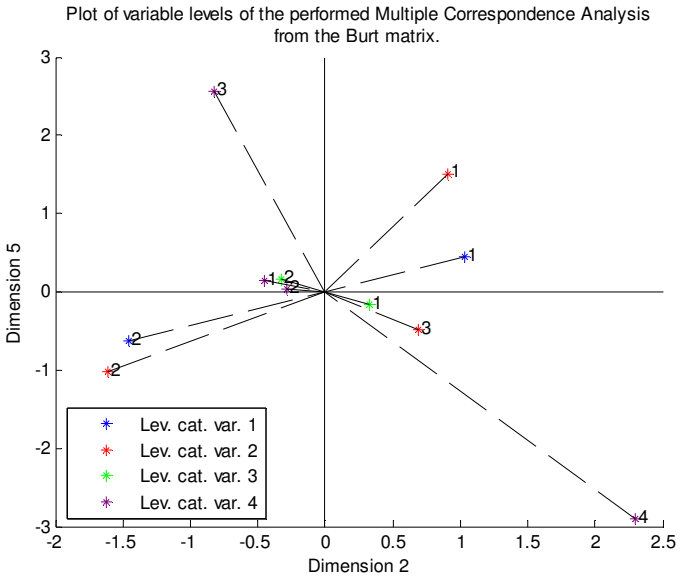
Are you interested to plot the origin reference of the variable levels? (y/n): **y**
Note: At the end of the program execution. If you are interested to fit the variable labels on the generated figures you can turn-on active button 'Edit Plot', do click on the selected label and drag to fix it on the desired position. Then turn-off active 'Edit Plot'.
Are you interested to plot the origin quadrature? (y/n): **y**



Do you need another plot? (y/n):**y**
Give me the interested dimensions to plot. Please, use [a b]:[**2 4**]
Are you interested to plot the origin reference of the variable levels? (y/n): **y**
Note: At the end of the program execution. If you are interested to fit the variable labels on the generated figures you can turn-on active button 'Edit Plot', do click on the selected label and drag to fix it on the desired position. Then turn-off active 'Edit Plot'.
Are you interested to plot the origin quadrature? (y/n): **y**

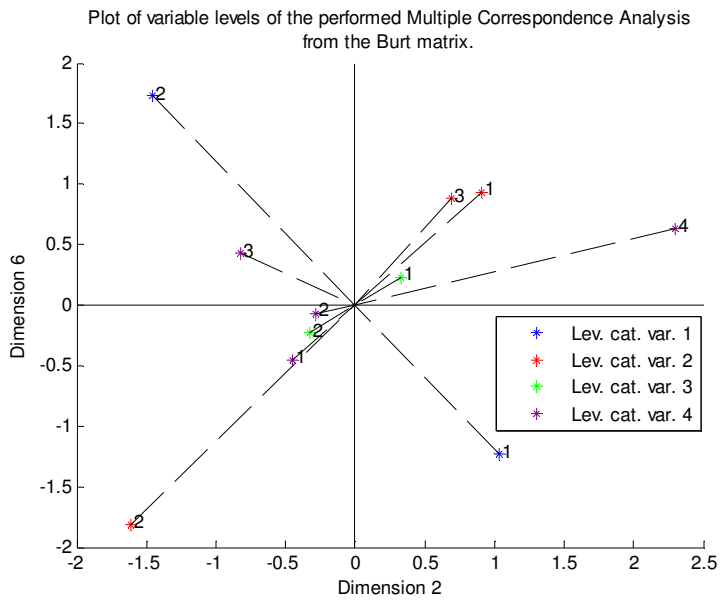


Do you need another plot? (y/n):**y**
Give me the interested dimensions to plot. Please, use [a b]:[**2 5**]
Are you interested to plot the origin reference of the variable levels? (y/n): **y**
Note: At the end of the program execution. If you are interested to fit the variable labels on the generated figures you can turn-on active button 'Edit Plot', do click on the selected label and drag to fix it on the desired position. Then turn-off active 'Edit Plot'.
Are you interested to plot the origin quadrature? (y/n): **y**

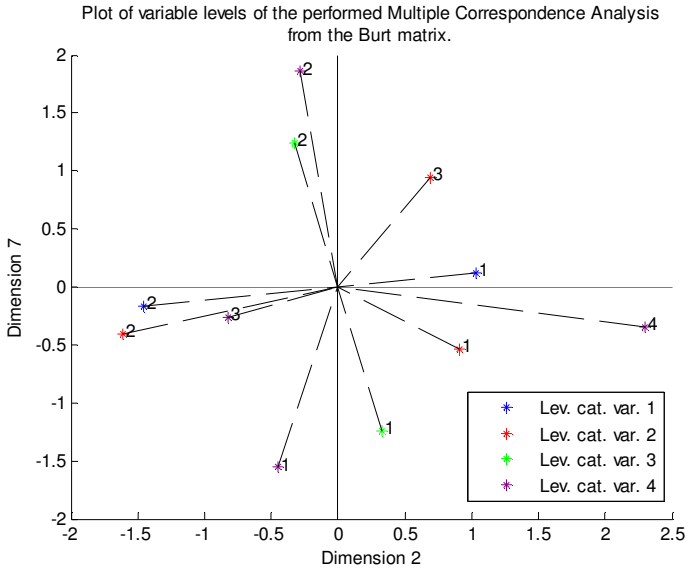


Do you need another plot? (y/n):**y**

Give me the interested dimensions to plot. Please, use [a b]:[**2 6**]
Are you interested to plot the origin reference of the variable levels? (y/n): **y**
Note: At the end of the program execution. If you are interested to fit the variable labels on the generated figures you can turn-on active button 'Edit Plot', do click on the selected label and drag to fix it on the desired position. Then turn-off active 'Edit Plot'.
Are you interested to plot the origin quadrature? (y/n): **y**



Do you need another plot? (y/n):**y**
Give me the interested dimensions to plot. Please, use [a b]:[**2 7**]
Are you interested to plot the origin reference of the variable levels? (y/n): y
Note: At the end of the program execution. If you are interested to fit the variable labels on the generated figures you can turn-on active button 'Edit Plot', do click on the selected label and drag to fix it on the desired position. Then turn-off active 'Edit Plot'.
Are you interested to plot the origin quadrature? (y/n): **y**



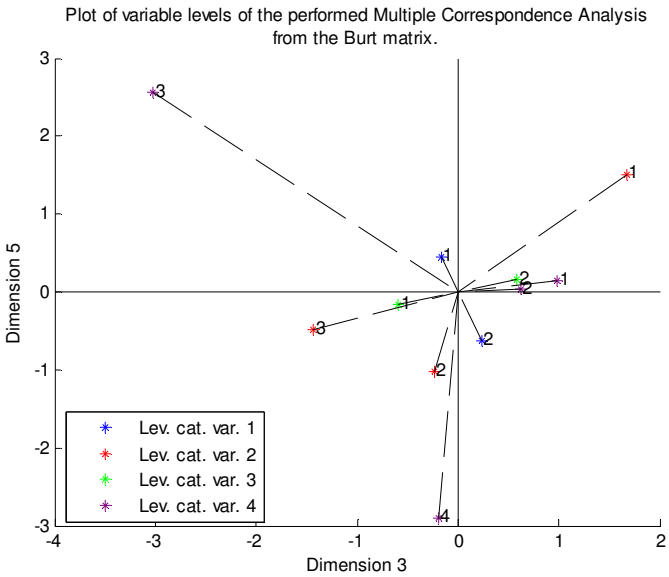
Do you need another plot? (y/n):**y**

Give me the interested dimensions to plot. Please, use [a b]:[**3 5**]

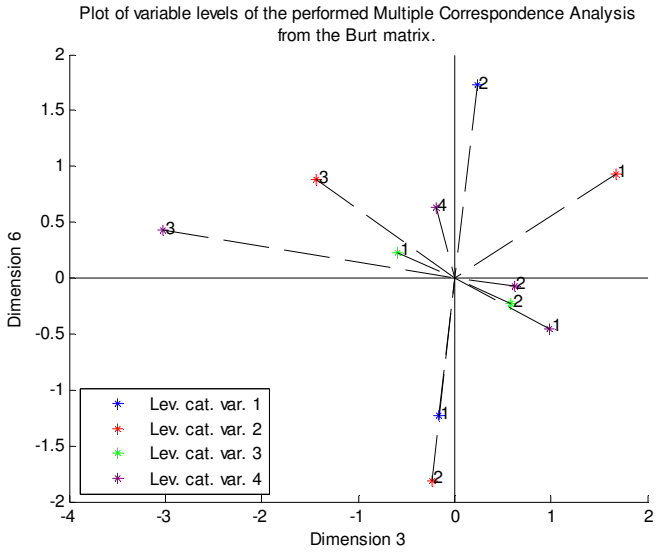
Are you interested to plot the origin reference of the variable levels? (y/n): **y**

Note: At the end of the program execution. If you are interested to fit the variable labels on the generated figures you can turn-on active button 'Edit Plot', do click on the selected label and drag to fix it on the desired position. Then turn-off active 'Edit Plot'.

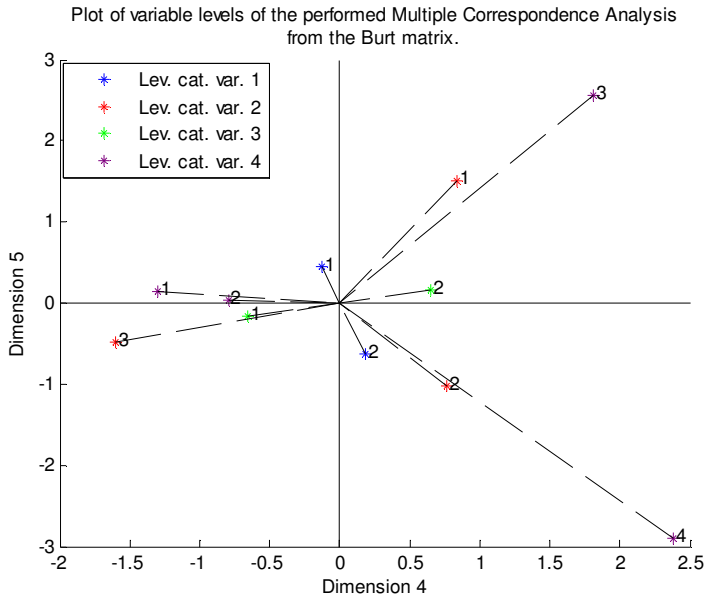
Are you interested to plot the origin quadrature? (y/n): **y**



Do you need another plot? (y/n):**y**
Give me the interested dimensions to plot. Please, use [a b]:[**3 6**]
Are you interested to plot the origin reference of the variable levels? (y/n): **y**
Note: At the end of the program execution. If you are interested to fit the variable labels on the generated figures you can turn-on active button 'Edit Plot', do click on the selected label and drag to fix it on the desired position. Then turn-off active 'Edit Plot'.
Are you interested to plot the origin quadrature? (y/n): **y**



Do you need another plot? (y/n):**y**
Give me the interested dimensions to plot. Please, use [a b]:[**4 5**]
Are you interested to plot the origin reference of the variable levels? (y/n): **y**
Note: At the end of the program execution. If you are interested to fit the variable labels on the generated figures you can turn-on active button 'Edit Plot', do click on the selected label and drag to fix it on the desired position. Then turn-off active 'Edit Plot'.
Are you interested to plot the origin quadrature? (y/n): **y**



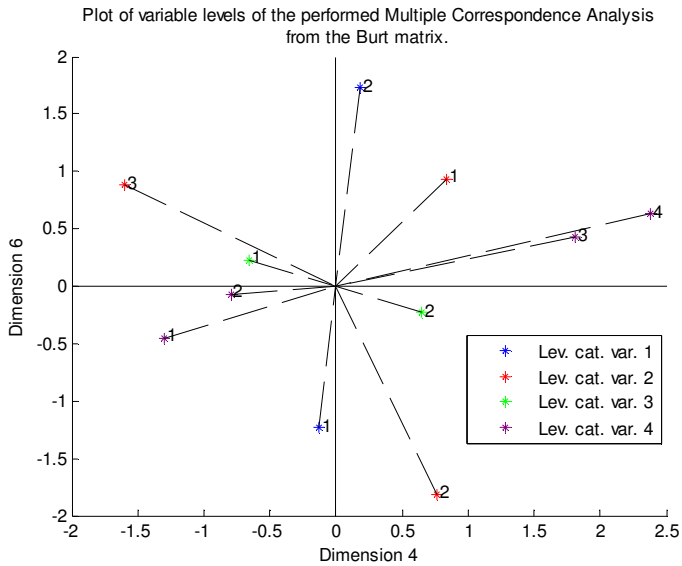
Do you need another plot? (y/n):**y**

Give me the interested dimensions to plot. Please, use [a b]:[**4 6**]

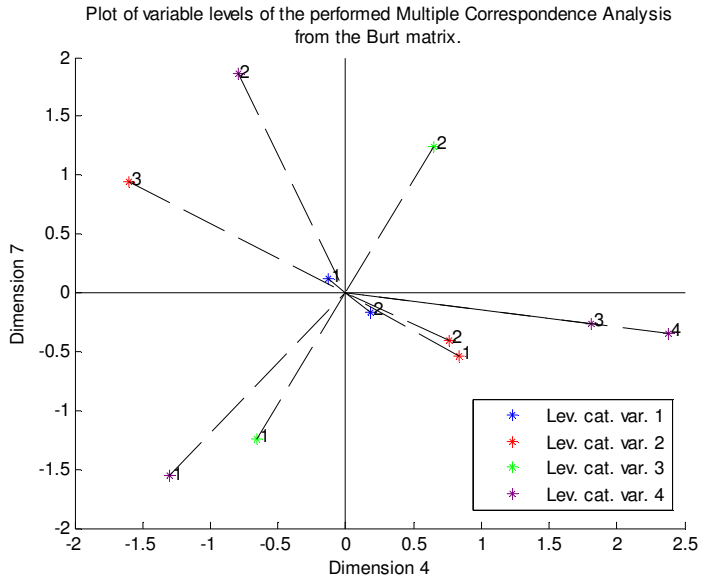
Are you interested to plot the origin reference of the variable levels? (y/n): **y**

Note: At the end of the program execution. If you are interested to fit the variable labels on the generated figures you can turn-on active button 'Edit Plot', do click on the selected label and drag to fix it on the desired position. Then turn-off active 'Edit Plot'.

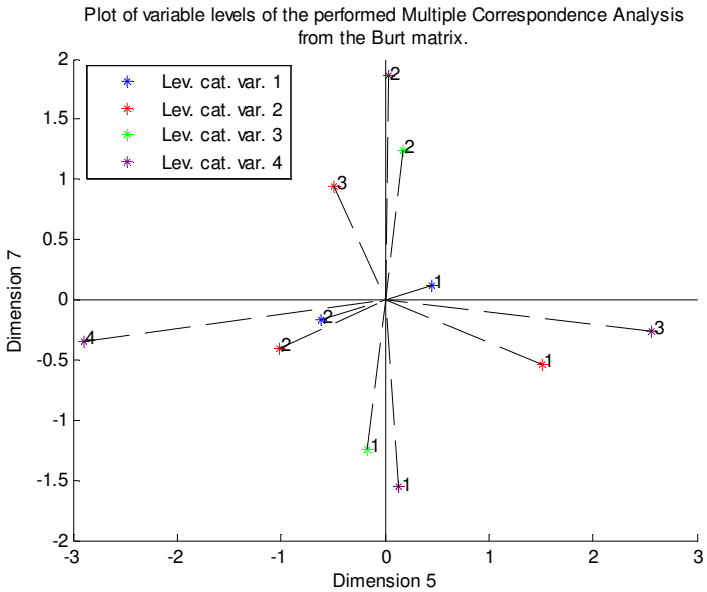
Are you interested to plot the origin quadrature? (y/n): **y**



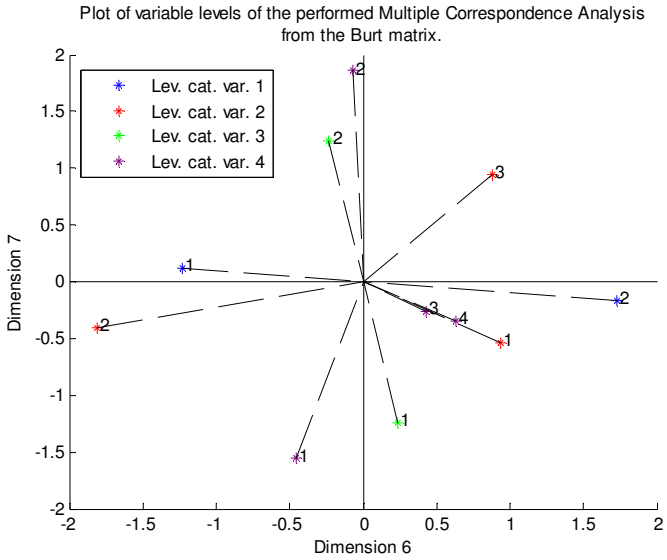
Do you need another plot? (y/n):**y**
Give me the interested dimensions to plot. Please, use [a b]:[**4 7**]
Are you interested to plot the origin reference of the variable levels? (y/n): **y**
Note: At the end of the program execution. If you are interested to fit the variable labels on the generated figures you can turn-on active button 'Edit Plot', do click on the selected label and drag to fix it on the desired position. Then turn-off active 'Edit Plot'.
Are you interested to plot the origin quadrature? (y/n): **y**



Do you need another plot? (y/n):**y**
Give me the interested dimensions to plot. Please, use [a b]:[**5 7**]
Are you interested to plot the origin reference of the variable levels? (y/n): **y**
Note: At the end of the program execution. If you are interested to fit the variable labels on the generated figures you can turn-on active button 'Edit Plot', do click on the selected label and drag to fix it on the desired position. Then turn-off active 'Edit Plot'.
Are you interested to plot the origin quadrature? (y/n): **y**



Do you need another plot? (y/n):**y**
Give me the interested dimensions to plot. Please, use [a b]:[**6 7**]
Are you interested to plot the origin reference of the variable levels? (y/n): **y**
Note: At the end of the program execution. If you are interested to fit the variable labels on the generated figures you can turn-on active button 'Edit Plot', do click on the selected label and drag to fix it on the desired position. Then turn-off active 'Edit Plot'.
Are you interested to plot the origin quadrature? (y/n): **y**



Do you need another plot? (y/n):**n**