**Mathematical Programming Project**

‘lagrange.m’ contains the code for the Lagrange multiplier.

To run the program the following steps need to be followed:

1. Declare variables using the ‘*syms*’ command. For example: to declare variables x and y type the following command on the command window:

*syms x y*

1. Declare the objective function that needs to be minimized. Call this function *‘f’*. For example:

*f(x,y)=x^2\*y;*

1. Declare the variables used as an character column vector. For example:

*var=[‘x’;’y’];*

To run the function type the following command in the command window:

*[ q,C,L,sol,vars,tempos,emin,emind,soll ] = lagrange( f,var,l );*

Explanation of the output:

*q*: contains the system of equations obtained after differentiating the Lagrange polynomial and the original constraints

*C*: contains all the sum of all constraints

*sol*: is a structure that contains the different solutions of the variables as well as ‘*Lamda’.* The values can be accessed using the access operator ‘.’ For example to get the solutions of x type the following command in the command window: ‘ *sol.x* ’

*vars*: contains the different variables involved in the equations

*tempos*: contains the value of the objective function ‘f’ evaluated at the different critical points

*emin*: contains the matrix formed by gradient and hessian matrix

*emind*: contains the determinant of the matrix emin

*soll*: contains roots of ‘emind’ evaluated at the critical points.