

## Homework 17 (Penalty Method)

Use the code provided(unconst22.f) or write one of your own for implementing penalty method to solve the following problem:

$$\min f(x) = x_1^2 + x_2^2$$

subject to the following inequality constraints:

$$\begin{cases} g_1(x) = (x_1 - 6)^2 + (x_2 - 9)^2 - 25 \leq 0 \\ g_2(x) = -(x_1 - 6)^2 + (x_2 - 7)^2 + 16 \leq 0 \\ g_3(x) = -x_1 \leq 0 \\ g_4(x) = -x_2 \leq 0 \end{cases}$$

With starting point  $x^0 = (9,11)^T$

Test the given problem with about program, flowcharted so that you show you understood how it works and how the penalty parameter is updated.

Please test your final solution and test that it satisfies indeed all the constraints.