Department of Mathematical and Computational Sciences National Institute of Technology Karnataka, Surathkal

sam.nitk.ac.in

nitksam@gmail.com

MA110 - Engineering Mathematics-1 Problem Sheet - 7

Lagrange Multipliers

- 1. Find three real numbers whose sum is 9 and the sum of whose squares is as small as possible.
- 2. Suppose a box with no top is to hold a certain volume *V*. Find the dimensions for the box that results in the minimum surface area.
- 3. Determine the maxima and minima of $f(x, y, z) = x^2 y^2$ on the surface $x^2 + 2y^2 + 3z^2 = 1$.
- 4. Find the isosceles triangle of maximum area with fixed perimeter length C.
- 5. Use the method of Lagrange Multipliers to find the maximum and minimum values of the function f(x, y) = 3x + 4y on the circle $x^2 + y^2 = 1$.
