

Assignment 11

1. Find a set of parametric equations for the tangent line to the curve of intersection of the surfaces at the given point.

$$z = \sqrt{x^2 + y^2}, \quad 5x - 2y + 3z = 22, \quad (3, 4, 5)$$

2. Find all relative extrema and saddle points of the function.

$$(a) \ f(x, y) = -5x^2 + 4xy - y^2 + 16x + 10 \quad (b) \ f(x, y) = \sqrt[3]{x^2 + y^2} + 2$$

3. Use Lagrange multipliers to find the indicated extrema, assuming that x , y , and z are positive.

$$\text{Maximize : } f(x, y, z) = x + y + z$$

$$\text{Constraint : } x^2 + y^2 + z^2 = 1$$

4. Use Lagrange multipliers to find the indicated extrema of f subject to two constraints, assuming that x , y , and z are nonnegative.

$$\text{Minimize : } f(x, y, z) = x^2 + y^2 + z^2$$

$$\text{Constraint : } x + 2z = 6, \quad x + y = 12$$