Lagrange Multipliers

Lecture for 6/24

Method of Lagrange Multipliers

Consider the region R described by $g = 0$ for continuous g

- What if R is complicated but we want to maximize f on R?
- Solve $\nabla f = \lambda \nabla g$
- Plug in all the values
  - Smallest will be min, largest will be max

Why This Works

Recall fact on graphs:

- If G_c is the graph of $f(x, y) = c$, then ∇f and G_c normal

Practice Problems

Find the max and min

- $f(x, y, z) = xyz$ subject to $x+y+z = 1$ and $x, y, z \geq 0$
- $f(x, y) = 4x^2+10y^2$ subject to $x^2+y^2 \leq 4$
- $f(x, y, z) = xyz$ subject to $x^2+y^2+z^2 = 1$

Scratchwork