

1. Problems

2. Estimate maximum and minimum values of the function:

$$f(x, y) = \frac{1}{\sqrt{1 + x^2 + y^2}} - 4x^2ye^{-\frac{x^2+y^2}{2}}$$

within the square $-3 \leq x; y \leq 3$.

3. Find the maximum and the minimum values, if they exist, of the function:

$$f(x, y) = x^3 + y^3 - 2(x^2 + y^2) + 10$$

on the circle $x^2 + y^2 = 1$.

4. Estimate the maximum and minimum values (if they exist) of

$$f(x, y) = x^2 + 8xy + y^2 - 2$$

subject to the constraint $x + 2y - 1 = 0$.