

Optimization problems.

1 Find the maximum value of $e^{-x^2}x^2$ in the interval $[0, 4]$

2 Use the conjugate gradient method to find the minimum of the quadratic form in three variables

$$F(x) = x^2 + 2y^2 + 2z^2 - 2x - 3y + z$$

3. Fit a curve of the form $y = ae^{bx}$ to the data given below by minimizing $\sum_{i=1}^5 (y_i - ae^{bx_i})^2$ over a and b .

x	y
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0	11.0
1	4.0
2	1.4
3	0.6
4	0.2

4. Find the maximum of $x_1 + 2x_2 + x_3$ subject to $x_1 + x_2 + x_3 = 1, x_1 \geq 0, x_2 \geq 0, x_3 \geq 0, x_1 - x_2 \geq 0$