talent sprint | Indian Institute of Science भारतीय विज्ञान संस्थान

1. Consider the following problem:

$$\begin{aligned} \text{maximize} \quad & f(x,y,z) = xyz \\ \text{subject to} \quad & h_1(x,y,z) \equiv x^2 + y^2 = 1, \\ \text{and} \quad & h_2(x,y,z) \equiv x + z \end{aligned}$$

2. Find the minimum value of $f(x,y) = 4x^2 + 3y^2$ subject to the constraint $g(x,y) = y + 2x - 8 = 0$

3. Find the KKT point (x^*, λ^*, μ^*) for the following inequality constrained optimization problem

$$\begin{aligned} \underset{1 \le x \le 2}{\text{minimize}} \quad & x^2 \\ \text{subject to:} \quad & x - 1 \ge 0 \\ & 2 - x \ge 0 \end{aligned}$$

4. Find the KKT point (x_1^*, x_2^*, μ^*) for the following inequality constrained optimization problem

$$\begin{aligned} \text{minimize} \quad & -(x-2)^2 - 2(y-1)^2 \\ \text{subject to:} \quad & x + 4y \le 3 \\ & x \ge y \end{aligned}$$