

# NLPP

---

# NON LINEAR PROG.

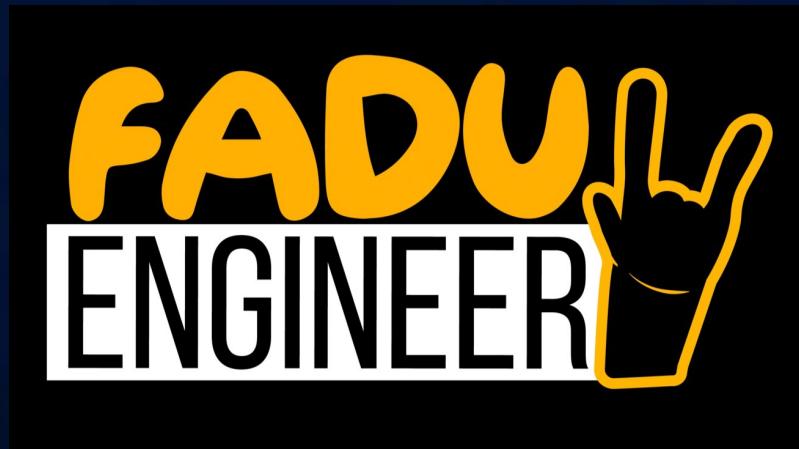
---

## Important Question Bank

Designed By

---

SAURABH DAHVADKAR



## Important Questions

1) Obtain the relative maximum or minimum of the function.

$$Z = x_1 + 2x_3 + x_2 x_3 - x_1^2 - x_2^2 - x_3^2$$

2) Using the method of Lagrange's multipliers solve the following NLPP.

Optimise:  $Z = 4x_1 + 8x_2 - x_1^2 - x_2^2$

Sub. to:  $x_1 + x_2 = 4,$

$x_1, x_2 \geq 0.$



3) Using Lagrange's multipliers, solve the following NLPP.

Optimise:  $Z = 3x_1^2 + x_2^2 + 2x_1 x_2 + 6x_1 + 2x_2$

Sub. to:  $2x_1 + x_2 = 4,$

$x_1, x_2 \geq 0.$

4) Use the method of Lagrange's multipliers to solve the following NLPP.

Optimise:  $Z = 2x_1^2 + x_2^2 + 3x_3^2 + 10x_1 + 8x_2 + 6x_3 - 100$

Sub. to:  $x_1 + x_2 + x_3 = 20,$

$x_1, x_2, x_3 \geq 0$

Designed by

**SAURABH DAHIVADKAR**

5) Using the method of Lagrange's multipliers to solve the following NLPP.

$$\text{Optimise: } Z = 12x_1 + 8x_2 + 6x_3 - x_1^2 - x_2^2 - x_3^2 - 23$$

$$\text{Sub. to: } x_1 + x_2 + x_3 = 10,$$

$$x_1, x_2, x_3 \geq 0.$$

6) Using the method of Lagrangian multipliers solve the following NLPP.

$$\text{maximise: } Z = 6x_1 + 8x_2 - x_1^2 - x_2^2$$

$$\text{Sub. to: } 4x_1 + 3x_2 = 16,$$

$$3x_1 + 5x_2 = 15,$$

$$x_1, x_2 \geq 0.$$

7) Using the method of Lagrangian multipliers solve the following NLPP.

$$\text{Optimise: } Z = 4x_1^2 + 2x_2^2 + x_3^2 - 4x_1 x_2$$

$$\text{Sub. to: } x_1 + x_2 + x_3 = 15,$$

$$2x_1 - x_2 + 2x_3 = 20,$$

$$x_1, x_2, x_3 \geq 0$$

8) Use the Kuhn - Tucker conditions to solve the following NLPP.

$$\text{maximise: } Z = 2x_1^2 - 7x_2^2 + 12x_1 x_2$$

$$\text{Sub. to: } 2x_1 + 5x_2 \leq 98,$$

$$x_1, x_2 \geq 0$$

9) Use Kuhn-Tucker conditions to solve following NLPP.

$$\text{maximise: } Z = 8x_1 + 10x_2 - x_1^2 - x_2^2$$

$$\text{Sub. to: } 3x_1 + 2x_2 \leq 6,$$

$$x_1, x_2 \geq 0.$$

10) Using the Kuhn-Tucker conditions solve the following NLPP.

$$\text{maximise: } Z = x_1^2 - x_2^2 - x_3^2 + 4x_1 + 6x_2$$

$$\text{Sub. to: } x_1 + x_2 \leq 2,$$

$$2x_1 + 3x_2 \leq 12,$$



$$x_1, x_2 \geq 0$$

11) Using the Kuhn-Tucker conditions solve the following NLPP.

$$\text{maximise: } Z = 2x_1 + 3x_2 - x_1^2 - 2x_2^2$$

$$\text{Sub. to: } x_1 + 3x_2 \leq 6,$$

$$5x_1 + 2x_2 \leq 10,$$

$$x_1, x_2 \geq 0.$$

12) Using Kuhn-Tucker conditions solve the following NLPP.

$$\text{minimise: } Z = 7x_1^2 + 5x_2^2 - 6x_1$$

$$\text{Sub. to: } x_1 + 2x_2 \leq 10,$$

$$x_1 + 3x_2 \leq 9,$$

$$x_1, x_2 \geq 0$$

Designed by  
SAURABH DAHIVADKAR