

Step-1

Let us consider the following linear programming problem

The constraints are as follows.

$$x \geq 0$$

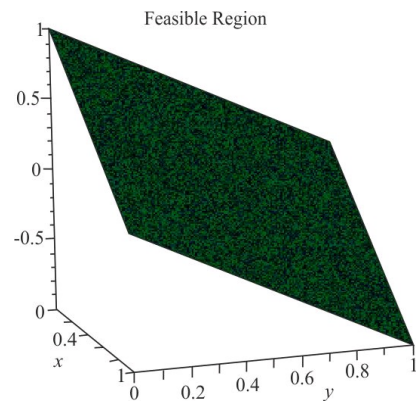
$$y \geq 0$$

$$z \geq 0$$

And the equation $x + y + z = 1$

Step-2

The required feasible region is a 3 dimensional plane satisfying the conditions.



The feasible region is **tetrahedron** in shape.

Step-3

And the corner points are as follows.

$$O = (0, 0, 0)$$

$$A = (1, 1, 0)$$

$$B = (0, 1, 1)$$

$$C = (1, 0, 1)$$

Step-4

Let us find the maximum value of the function $F = x + 2y + 3z$ at the corner points

$$\begin{aligned}
 F_O &= x+2y+3z \\
 &= 0+0+0 \\
 &= 0
 \end{aligned}$$

$$\begin{aligned}
 F_A &= x+2y+3z \\
 &= 1+2(1)+0 \\
 &= 3
 \end{aligned}$$

$$\begin{aligned}
 F_B &= x+2y+3z \\
 &= 0+2(1)+3(1) \\
 &= 5
 \end{aligned}$$

$$\begin{aligned}
 F_C &= x+2y+3z \\
 &= 1+0+3(1) \\
 &= 4
 \end{aligned}$$

Thus, the maximum value of the function is 5, and it occurs at $\mathbf{B} = (0, 1, 1)$