MP Home Assignment - 2

2300030642
S. Nishitha

① max $z = 3x_1 + x_2 + 3x_3$

$$-x_1 + 2x_2 + x_3 \le 4$$

$$2x_2 - \frac{3}{2}x_3 \le 1$$

$$x_1 - 3x_2 + 2x_3 \le 3$$

$$x_1, x_2, x_3 \ge 0$$

→ Convert to standard form

$$-x_1 + 2x_2 + x_3 + s_1 = 4$$

$$2x_2 - \frac{3}{2}x_3 + s_2 = 1$$

$$x_1 - 3x_2 + 2x_3 + s_3 = 3$$

~~max(z)~~ ⇒ $z - 3x_1 - x_2 - 3x_3 = 0$.

$x_1 = 5.33$, $x_2 = 3$, $x_3 = 3.33$

$\therefore z = 29$

After applying the gomory cutting plane method,

The fractional parts are:

0.33 is the optimal solution.

$\ldots x_1 + 40x_2 + 30x_3 + 50x_4$

$5x_1 + 4x_2 + 6x_3 + 3x_4 \le 10$

$dp[i][w] = \max(dp[i-1][w],\ v_i + dp[i-1][w-w_i])$

$dp[i-1][w]$

$v_i + dp[i-1][w-w_i]$

$dp[0][w] = 0$

$0 \le x_i \le 1$

$x_1 = 0,\ x_2 = 1,\ x_3 = 0.67,\ x_4 = 1$

By using simplex method, we can get the above xi values.

Now,

apply branch and bound,

$x_3 = 1$

$x_3 = 0 \Rightarrow x_1 = 0,\ x_2 = 1,\ x_3 = 0,\ x_4 = 1$

$\max z = 40(1) + 50(1) = 90$

$\therefore$ Optimal solution is 90.