

## Session 12 – Examples

Write the following LP problem in standard form.

Maximize  $2x_1 + 4x_2$

s.t.  $x_1, x_2 \geq 0$  and

$1x_1 + 1/2x_2 \leq 10$

$1x_1 + 3/2x_2 \leq 18$

$1x_1 + 1x_2 = 12$

Initial Simplex Tableau:

<i>Basis</i> $c_B$		$x_1$	$x_2$	$s_1$	$s_2$	$a_1$		Ratio
		2	4	0	0	-M		$b_i/a_{i1}$
$s_1$	0	1	1/2	1	0	0	10	20
$s_2$	0	1	3/2	0	1	0	18	12
$a_1$	-M	1	1	0	0	1	12	12
$z_j$		-M	-M	0	0	-M		
$c_j - z_j$		2+M	4+M	0	0	0	-12M	

Tableau after the First Iteration:

<i>Basis</i> $c_B$		$x_1$	$x_2$	$s_1$	$s_2$	$a_1$	
		2	4	0	0	0	
$s_1$	0	1/2	0	1	0	-1/2	4
$s_2$	0	-1/2	0	0	1	-3/2	0
$x_2$	4	1	1	0	0	1	12
$z_j$		4	4	0	0	4	
$c_j - z_j$		-2	0	0	0	-4	48

Identify the optimal solution.

Construct the initial simplex tableau for the following LP problem.

Maximize  $60x_1 + 90x_2$

s.t.

$$15x_1 + 45x_2 \leq 90$$

$$5x_1 + 5x_2 \leq 20$$

$$x_1, x_2 \geq 0$$

		$x_1$	$x_2$	$s_1$	$s_2$		
<i>Basis</i>	$c_B$						<b>Ratio</b>
	$z_j$						
	$c_j - z_j$						

Identify the current basic feasible solution and associated value of the objective function.

Which variable would be brought into the solution (given a positive value) at the next iteration?

Which variable would leave the basis?

How many units of the entering variable will be in the next basic feasible solution?

What do you think will be the value of the objective function after the next iteration?

Calculate the tableau after the next (first) iteration.

		$x_1$	$x_2$	$s_1$	$s_2$		
<i>Basis</i>	$c_B$						<b>Ratio</b>
	$z_j$						
	$c_j - z_j$						