# Bounded Variable method.

## Procedure

Step 1: Convert the minimization problem L.P.P into that of maximization. If any $b_i$'s (R.H.S constant in the constraints) is negative, multiply the corresponding constraint by $-1$.

Step 2: Convert the inequations of the constraints into equations and obtain an initial basic feasible solution

Step 3: If any one of the variable is at a positive lower bound, substitute it out at its lower bound (or) convert its lower bound as zero by assuming $x_j' = x_j - l_j$

Step 4: construct $I^{st}$ Iteration table by usual simplex method.

Step 5: Select least value ($-ve$) corresponding variable its corresponding entering variable. Let it be $x_r$ upper bound $u_r$, (say)

Step 6: To find leaves variable compute $\theta$ where $\theta = \min\{\theta_1, \theta_2, u_r\}$ where $u_r$ is upper bound of the entering Vari'

$$\theta_1 = \min\left\{\frac{\text{solution}}{+\text{ coefft of pivot column}}\right\} = \min\left\{\frac{X_{B_i}}{a_{ir}}\right\}_{a_{ir}>0}$$

$$\theta_2 = \min\left\{\frac{\cancel{\text{soln}}\ u_r - X_{B_i}}{-ve\text{ coefft of pivot column}}\right\} = \min\left\{\frac{u_r - X_{B_i}}{-a_{ir}}, a_{ir}<0\right\}$$

$$\theta = \min\{\theta_1, \theta_2, u_r\}$$

Note: If all the pivot column coeffts are $>0$ then $\theta_2 = \infty$.

Step 7:

Case (i) If $\theta = \theta_1$ corresponding variable is leaves variable, apply usual simplex method procedure

Construct new table


case(ii) If $\theta = \theta_2$ apply usual simplex method Procedure construct new table.

case(iii) If $\theta = u_r$ [here entring and leaves variable same]

in that case replace ~~the~~ in the pivot column $x_r$ by $x_r'$ where $x_r' = u_r - x_r$

and multiply pivot column by $(-1)$

and new solution

$$X_B^{new} = X_B^{old} - (\text{elt in the pivot column} \cdot u_r)$$

~~ret~~ remaining row are same. (unaltered)

step8 Go to step5 and repeat the procedure until we get optimum solution.