So if $(-2+r) \le 0$

i.e. $r \le 2$

the coefficient of the nonbasic variable x_3 will still be negative and the previous optimal solution will still be optimal in the new problem

On the other hand if $r > 2$ the coefficient of x_3 becomes positive making x_3 a candidate to enter the basis. However, we can use the primal simplex method to reoptimize the new problem (since A and b are unchanged, the previous primal optimal solution to LP (1) is still feasible in the new problem).

EXERCISE: —

Choose $r = 3$ and reoptimize the new problem.

ALTERNATE method using primal and dual simplex codes: —

(a) Solve the original LP (1) for

$$x^* = \begin{bmatrix} 2 \\ 2 \\ 0 \\ 0 \end{bmatrix} \text{ and } y^* = \begin{bmatrix} -10 \\ 7 \end{bmatrix}$$

and an optimal objective value of 12.