So if \((-2 + r) \leq 0\)
\[1 - e^r \leq 2\]

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 \(\text{I}\) 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 \(\text{I}\)

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

and an optimal objective value of 12.