27.02.2025

IE 203 PS 3

1- Solve the IP below using the cutting plane algorithm, generating Gomory cuts at each iteration.

$$\begin{aligned} \min \quad & x_1 - 3x_2 \\ s.t. \quad & x_1 - x_2 \leq 2 \\ & 2x_1 + 4x_2 \leq 15 \\ & x_1, x_2 \in \mathbb{Z}_{0,+} \end{aligned}$$

2- The following is an optimal Simplex tableau of the linear relaxation of the integer program below. Generate Gomory cuts using both rows with fractional RHS. Observe visually which of these cuts is better.

	x_1	x_2	s_1	s_2	RHS
z	0	0	$5/4$	$1/4$	$31/4$
x_2	0	1	$3/4$	$-1/4$	$9/4$
x_1	1	0	$1/4$	$1/4$	$11/4$

Corresponding Integer Program:

$$\begin{aligned} \max \quad & 2x_1 + x_2 \\ s.t. \quad & x_1 + x_2 \leq 5 \\ & 3x_1 - x_2 \leq 6 \\ & x_1, x_2 \in \mathbb{Z}_{0,+} \end{aligned}$$