



$$\begin{array}{ll}
 \max & x_2 \\
 \text{s.t.} & x_1 + x_2 \leq 10 \\
 & x_1 \leq 6 \\
 & 3x_1 + 2x_2 \leq 26
 \end{array}$$

standard initial basis:

$$\begin{array}{rcl}
 z & -x_2 & = 0 \\
 x_1 + x_2 + x_3 & & = 10 \\
 x_1 + x_4 & & = 6 \\
 3x_1 + 2x_2 + x_5 & & = 26
 \end{array}
 \quad
 \begin{array}{l}
 x_3 = 10 \quad x_4 = 6 \quad x_5 = 26 \\
 z =
 \end{array}$$

x_1 enters

→ why? e.g. get initial basis with more original variables

$$\begin{array}{rcl}
 z & -x_2 & = 0 \\
 x_2 + x_3 - x_4 & & = 4 \\
 x_1 + x_4 & & = 6 \\
 2x_2 - 3x_4 + x_5 & & = 8
 \end{array}
 \quad
 \begin{array}{l}
 x_1 = 6 \quad x_3 = 4 \quad x_5 = 8 \\
 z = 0
 \end{array}$$

x_2 enters
 x_3 leaves

x_4 enters
 x_5 leaves

$$\begin{array}{rcl}
 z & +x_3 - x_4 & = 4 \\
 x_2 + x_3 - x_4 & & = 4 \\
 x_1 + x_4 & & = 6 \\
 -2x_3 - x_4 + x_5 & & = 0
 \end{array}
 \quad
 \begin{array}{l}
 x_1 = 6 \quad x_2 = 4 \quad x_5 = 0 \\
 z = 4
 \end{array}$$

$$\begin{array}{rcl}
 z & +x_3 - x_5 & = 4 \\
 x_2 + 3x_3 & & = 4 \\
 x_1 - 2x_3 + x_5 & & = 6 \\
 2x_3 + x_4 - x_5 & & = 0
 \end{array}
 \quad
 \begin{array}{l}
 x_1 = 6 \quad x_2 = 4 \quad x_4 = 0 \\
 z = 4
 \end{array}$$

↓
degenerate pivot!