Midterm Examination I

CS 525, Semester I, 1999-2000

Monday November 8, 1999

If a problem has no solution or an infinite number of solutions, you must clearly state so and justify your claim. Linear dependence relationships should be explicitly stated if they are present.

Each problem can be solved in 3 tableaus or less including the initial tableau.

1. Solve:

\[ \begin{align*}
    x_1 + 3x_2 - 2x_3 + x_4 &= 1 \\
    2x_2 + x_4 &= 2 \\
    3x_1 + 7x_2 - 6x_3 + 2x_4 &= 1
\end{align*} \]

2. Solve:

\[
\begin{align*}
\text{min} & \quad x_1 - 2x_2 + 3x_3 \\
\text{subject to} & \quad -x_1 + x_2 - 3x_3 \geq 1 \\
& \quad x_1 + 4x_2 + 4x_3 \leq 3 \\
& \quad 4x_1 + x_2 - 6x_3 \leq 4 \\
& \quad x_1, x_2, x_3 \geq 0
\end{align*}
\]