CS525 Open-Book Final Exam

Wednesday, December 18, 1996
12:25 p.m., 594 Van Hise

Answer all questions: 1, 2, 3. If any question is missing from your sheets, inform the instructor.

Each of Problems 1, 2 and 3 can be completely solved by 2 pivots only.

Last Name (Print):____________________

First Name: ________________________

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Do not write anything on this page.

Grades

1. **Question 1:**————–
2. **Question 2:**————–
3. **Question 3:**————–
4. **Total:**——————–

1. (10 points)

$$
\begin{array}{ll}
\text{minimize} & \frac{x_1^2}{2} - x_1 x_2 + \frac{x_2^2}{2} + 8x_1 - 2x_2 \\
\text{subject to} & \begin{array}{rcrcr} x_1 & + & 2x_2 & \geq & 1 \\ x_1 & - & x_2 & \geq & -7 \\ x_1 & , & x_2 & \geq & 0 \end{array}
\end{array}
$$

Problem 1 Sheet

2. (10 points) Solve: $\min_{x \geq 0} \|Ax - b\|_\infty$ for the system $Ax = b$:

$$\begin{array}{rcrcr} x_1 & + & x_2 & = & 1 \\ x_1 & - & x_2 & = & -2 \end{array}$$

Note that $x \geq 0$.

Problem 2 Sheet

3. (10 points) Solve for all values of the parameter t in the interval $(-\infty, \infty)$. Fill in the summary table on the next page with three columns: parameter t range, minimum value $z(t)$ and solution point $x(t)$.

$$
\begin{array}{ll}
\text{minimize} & -x_1 + t(2x_1 + x_2) \\
\text{subject to} & \begin{array}{rcrcr} -x_1 & + & x_2 & \geq & -1 \\ -x_1 & & & \geq & -2 \\ x_1 & , & x_2 & \geq & 0 \end{array}
\end{array}
$$

Problem 3 Sheet

Paremeter t Range	Minimum Value $z(t)$	Solution Point $x(t)$