

General Mathematics and Computational Science I

Exercise 17

November 15, 2005

1. Find all solutions for the underdetermined linear system $Ax = b$, where

$$A = \begin{pmatrix} 2 & 2 & 1 & 0 \\ 1 & 1 & 1 & 1 \\ 1 & 1 & 0 & -1 \\ 3 & 3 & 2 & 1 \end{pmatrix} \quad \text{and} \quad b = \begin{pmatrix} -1 \\ 1 \\ -2 \\ 0 \end{pmatrix} .$$

2. Write the following linear programming problem in its standard form.

Maximize

$$z = 2x_1 - x_2 + x_3$$

subject to

$$x_1 - x_2 \leq 1 ,$$

$$x_2 - x_3 \geq 1 ,$$

$$x_3 - x_1 \leq 3 ,$$

$$x_1 \geq -2 ,$$

$$x_2 \leq 1 ,$$

$$x_3 \leq 0 .$$