Unified Engineering I **Fall 2003**

Problem S1 (Signals and Systems)

1. Consider the system of equations

$$\begin{array}{rcrcrcr} x & + & y & - & 2z & = & -1 \\ x & + & 4y & + & 2z & = & 5 \\ x & + & y & - & z & = & 0 \end{array}$$

Solve for x, y, and z, in three separate ways. The goal of part (1) is to practice solving systems of equations, so that when you get to part (2), you will have a fair basis of comparison.

(a) Determine x, y, and z using (symbolic) elimination of variables.

(b) Determine x, y, and z by Gaussian reduction.

(c) Determine x, y, and z using Cramer's rule.

2. Consider the system of equations

$$\begin{array}{rcrcrcr} 4x & + & 2y & + & 2z & = & 7 \\ 3x & + & y & + & 2z & = & 5 \\ x & + & 3y & - & z & = & 4 \end{array}$$

Again, solve for x, y, and z, in three separate ways. This time, please time each part (a), (b), (c) below.

(a) Determine x, y, and z using (symbolic) elimination of variables.

(b) Determine x, y, and z by Gaussian reduction.

(c) Determine x, y, and z using Cramer's rule.

(d) How much time did each method take?

(e) Which method do you prefer? When answering this question, think about how much time might be required for a larger system, say, one that is 5×5.