Math 290 Spring 2007 Project 02

Due Tuesday February 13

Name

Be sure to re-read the WRITING GUIDELINES rubric, since it defines how your project will be graded. In particular, you may discuss this project with others but **you may not collaborate on the written exposition of the solution.**

"Whoever despises the high wisdom of mathematics nourishes himself on delusion and will never still the sophistic sciences whose only product is an eternal uproar." – Leonardo Da Vinci

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Advanced Reading Exercise

Reading mathematics well involves skills that are not typically stressed in other courses. In particular, it is a good idea to use paper and pencil while reading. This is especially necessary when reading a proof that is as dense with notation as is Theorem VFSLS (Vector Form of Solutions to Linear Systems) on pages 109-112. The **use** of this theorem is actually quite easy as is illustrated by the three step process described in the textbook. The value of the proof is that it **verifies** that the process will always produce the solution set of the linear system. In addition, it gives us the notation to use when we need to be **very** careful when working with solution sets.

The following matrix B is the row-equivalent matrix in reduced row-echelon form for the augmented matrix $[A|\mathbf{b}]$ of a linear system of equations $LS(A, \mathbf{b})$. Write a paper that uses B as a guide to follow the proof of Theorem VFSLS. Specifically, your paper should work through the proof of Theorem VFSLS including all of the notation in the proof as well as what that notation designates for the specific matrix B below.

$$[A|\mathbf{b}] = \begin{bmatrix} 1 & -3 & -2 & 0 & 2 & 7 & 11 \\ 2 & 2 & 4 & -1 & 5 & -5 & -3 \\ 3 & 0 & 3 & 1 & 5 & 6 & 7 \\ 4 & -4 & 0 & 0 & 8 & 12 & 20 \end{bmatrix} \text{ and } B = \begin{bmatrix} 1 & 0 & 1 & 0 & 2 & 1 & 2 \\ 0 & 1 & 1 & 0 & 0 & -2 & -3 \\ 0 & 0 & 0 & 1 & -1 & 3 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$