Challenge Exercise 4
MATH 1281 – 2007/08
Due Date: March 14, 2008

These challenge exercises ask you questions about material covered in class, but at a greater depth. You are not required to do this exercise; it is intended as extra work. However, you will receive extra credit if you complete the problem correctly.

When handing this assignment in, please clearly label your work as a Challenge Exercise. Make sure to include your name.

Problem.

(1) **[5pts]** Let f_n denote the nth Fibonacci number. Show that if $a_n = a_{n-1} + a_{n-2}$, $a_0 = s$ and $a_1 = t$, where s and t are constants, then

$$a_n = sf_{n-1} + tf_n \text{ for all } n \geq 0$$

(2) **[5pts]** Let $\mathcal{M}_{m\times n}$ be the set of $m \times n$ matrices of size $m \times n$. If $M, N \in \mathcal{M}$, we write $M \leq N$ if $m_{ij} \leq n_{ij}$ for all $1 \leq i \leq m$ and $1 \leq j \leq n$. Prove that $\leq$ is a partial order on the set $\mathcal{M}_{m\times n}$.