

Computer Project 1
Math 2270, Spring 2002
Due January 31

Note: where it says to use Maple below, feel free to use whichever computer tool you prefer (e.g. Mathematica or Matlab). However, there is already a lot of code written for Maple, so you may wish to use it.

1. (These questions are modified from problems on page 27 of *Multivariable mathematics with Maple* by J.A. Carlson and J. M. Thompson.) You are to create a Maple document in which you answer questions using a mixture of Maple computations and text insertions. Print out a copy of this document and hand it in. Let

$$A := \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$

and

$$B := \begin{bmatrix} 2 & 1 & 0 \\ 1 & 2 & 1 \\ 0 & 1 & 2 \end{bmatrix}.$$

- (a) Compute AB and BA . Are they the same?
 - (b) Compute $A + B$ and $B + A$. Are they the same?
 - (c) Let $C = A + B$. Compute C^2 and compare it to $A^2 + 2AB + B^2$. Is there a small modification you can make to $A^2 + 2AB + B^2$ so that you obtain the same thing as C^2 ? Explain your answer.
 - (d) Let $v = (1, 2, 3)$ as a vector. Compute Av . What does Maple say when you ask it to compute vA ?
 - (e) Solve the matrix equation $Bx = v$ for x in three ways: row reduce B , use `linsolve` and multiply by the inverse of B .
2. Create a document in which you draw some pictures of a fractal (or several, if you please). You may want to recreate some of the fractals shown in class, or you may wish to make something up. In any case, be sure to explain how you create the fractal via a finite collection of affine maps. You should include the fractal template (the “L” picture) and an explanation of what the affine maps do geometrically. You may use any of the code handed out in class.