

MAT331 Exercises, Spring 08

set number 2

5. (*expires 9/19*) The *Fibonacci sequence* is a sequence of positive integers defined by recurrence as follows: $F_0 = 1$, $F_1 = 1$ and for each integer i larger than one,

$$F_i = F_{i-1} + F_{i-2}.$$

Use Maple to find the first 100 terms of the sequence **without computing these terms one by one** (Hint: See [Fibonacci](#)). Use the sequence you found to compute a new sequence F_i/F_{i-1} and try to guess what is the limit of that new sequence. EXTRA CREDIT: Prove the sequence F_i/F_{i-1} converges to the limit you guessed (You may need to refine your guess to do so).

6. (*expires 9/19*) Fit the points $(-1.9, -4.7)$, $(-0.8, 1.2)$, $(0.1, 2.8)$, $(1.4, -1.2)$, $(1.8, -3.5)$ by means of a quadratic function $f(x) = ax^2 + bx + c$, using the least square method. First, do this step by step, as we did in class; then, use the built-in Maple command, described in the notes. Check that the two solutions agree.
7. (*expires 9/19*) Fit the set of points

$$(1.02, -4.30), (1.00, -2.12), (0.99, 0.52), (1.03, 2.51), (1.00, 3.34), (1.02, 5.30)$$

with a line, using the least square method we used in class. You will see that this is not a good fit. Think of a better way to find a line which *is* a good fit and use Maple to do it. Explain in your solution why you think your better way is indeed better.