

# ASSIGNMENT 3

Due February 17, 2005 (before start of class)

## Problem 4

For any  $x_0 > -1$ , the sequence defined recursively by

$$x_{n+1} = 2^{n+1} \left[ \sqrt{1 + 2^{-n}x_n} - 1 \right]$$

mathematically converges to  $\ln(x_0 + 1)$ . Write a MATLAB program to generate such a sequence for  $x_0 = 2$ . Does the sequence converge to  $\ln(3)$ ? Comment on your findings as much as you can.

Next arrange the formula in a way that will allow you to compute a more accurate result. Write a MATLAB program to generate this new sequence. Also comment on your findings as much as possible.

There is no need to write functions for this assignment. Name your programs using the same convention as before and send them to me at [mleung@duke.poly.edu](mailto:mleung@duke.poly.edu) as e-mail attachments. Turn in a hardcopy of your homework before class on Feb. 17.