AUMAT/AUPHY/AUCSC 340 – Numerical Methods

Winter 2019

Assignment 1

Submission deadline: Monday, 11 Feb 2019, 8:30am (ideally in class)

1. Write a Matlab program that converts $(123)_{10}$ into
   a) a binary number, using 8 bits (digits), and
   b) a ternary number, $\{0,1,2\}$, using 8 digits.

2. Binary addition:
   a) Express 7 and 17 as the shortest binary numbers possible.
   b) Add these two binary numbers.
   c) Convert the result in b) back to decimal numbers. Do you find agreement?

   Hint:

   0 + 0 = 0
   0 + 1 = 1
   1 + 0 = 1
   1 + 1 = 10 (which is 0 carry 1)

3. Problem 2.9 in Lecture Notes by Morten Hjorth-Jensen (use Matlab)

4. Investigate the range and precision of number representations in Matlab by use of the Command Window. Type

   ```
   >> a=10^x
   ```

   and hit return, where x is an integer. Increase/decrease x until you find something interesting. What do you observe?

5. Floating point number: (see Week 2, p.16, and Lecture Notes, p. 21)
   What is the 32-bits binary number

$$(01001110110001111001011100001010)_2$$

   in decimal representation?