

# Numerical Methods

## Homework 1

Due: Wednesday, April 17th, 11:00 am  
or per email on Tuesday to [cpopov59@gmail.com](mailto:cpopov59@gmail.com)

### 1. Changing number systems

- a) Express the following numbers in the decimal system or as simple fractions (i.e., with numerator and denominator) of decimal numbers:

$$10011.01_2, E2E4_{16}, 0.\bar{2}_7 \quad (\equiv 0.222\cdots_7)$$

- b) What is  $319408_{10}$  in the hexadecimal system (base  $b = 16$ )?  
c) What is  $432.125_{10}$  as binary number ( $b = 2$ )?

### 2. Finite expression?

Assume  $\frac{1}{n}$  with  $n \in \mathbb{N}$  is expressed in comma-notation using some base  $b$ . Under which condition is this expression finite?  
(E.g.,  $\frac{1}{4} = 0.25_{10}$  is a finite and  $\frac{1}{4} = 0.1111\cdots_5 \equiv 0.\bar{1}_5$  an infinite expression.)

### 3. Using a different base

Calculate  $355_6 * 21_6$  within the hexal system ( $b = 6$ ).