

Computable Analysis
SS 2013, Exercise Sheet #7

EXERCISE 15:

- a) Analyze the asymptotic computational complexity of real addition $[0; 1]^2 \ni (x, y) \mapsto x + y$ in terms of the precision parameter n . (And “polynomial time” is too coarse an answer here.)
- b) Now repeat a) but for $[0; K]^2 \ni (x, y) \mapsto x + y$ in terms of both parameters n and K .
- c) How about multiplication?
- d) How about the exponential function?
- e) Suppose (a_m) is a real sequence computable in time polynomial in $n + m$ and satisfying $\limsup_m a_m^{1/m} < 1$. What can you say about the computational complexity of $[-1; 1] \ni x \mapsto \sum_m a_m x^m$?
- f) Explicitly state a function $f : [0; 1] \rightarrow [0; 1]$ computable in doubly exponential time but not in single exponential time.