

## Homework Assignment for Week 03

**Goal:** Study both theoretical and practical aspects of Fixed Point Iteration.

0. Hint for problem 22, section 1,2: The absolute errors of the two partial sums for  $\exp(5)$  and  $\exp(-5)$  are of the form  $A + B$  and  $A - B$ , respectively. One can show that  $A - B < A + B < C_n(A - B)$ , where  $C_n \leq 3$  for  $n = 9, 10, 11$ . One can use it to estimate the relative errors of the two partial sums.
1. Study the proof of convergence and error bounds for Fixed Point Iteration, Theorem 2.4 and Corollary 2.5.
2. Section 2.2: Problems 9, 14(a), 20.
3. Section 2.2: Problems 14(a) revisited. Find a suitable choice of  $\alpha$  to accelerate the convergence using the modified fixed point iteration we showed in class.