Unit IV. Lessons distribution and self-assesment questions.

- Lesson 1. Sections 1 to 2.1.

  1. Is the distance between two functions the maximum of the point-to-point distances?
  2. Can we form a functional sequence with discontinuous functions? Give an example.
  3. If the functions f_n of a sequence are continuous, will its limit function be continuous?
  4. Give an example of a sequence of continuous f_n that converge to a discontinuous ϕ.
  5. Give an example of a sequence of discontinuous f_n that converge to a continuous ϕ.

- Lesson 2. Sections 2.2 to 3.3.

  1. What happens to a functional series defined in I, if we replace x by one of its values on I?
  2. Is there always the sum functionof a geometric series of ratio x?
  3. Under what conditions is the integral of the sum the sum of the series of integrals?
  4. Does every sequence of real numbers have a limit, finite or infinite?
  5. Can the interval of convergence of a power series take any form?

- Lesson 3. Sections 3.4 and 3.5.

  1. If the radius of convergence of $\sum a_n x^n$ is $r > 0$, what do we know about its sum $S(x)$?
  2. If $\sum a_n x^n$ converges at $x = r > 0$, what type of convergence will there be on $\left[\frac{r}{3}, \frac{r}{2}\right]$?
  3. What do we use Abel's second theorem for?
  4. If $\sum a_n$ is a power series expansion of f, does its interval of convergence coincide with that of existence of f?
  5. Does any function $f \in C^\infty$ have a Taylor series expansion?