Institute of Nature and life Sciences

Department of NLS

Module: Mathematics Statistics

Graduation(year one) NLS, Semester I

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## Series of exercises N 4

## Exercise 1

Study the nature of numerical series with general term  $u_n$  and calculate their sum

$$\mathbf{0} \ u_n = \frac{1}{(n+1)(n+2)}, \quad n \ge 0.$$

**2** 
$$u_n = \ln(1 + \frac{1}{n}), \quad n \ge 1.$$

**8** 
$$u_n = \frac{n^2 - 1}{n - 1}, \quad n > 1.$$

## Exercise 2

Study the nature of the following numerical series

$$\bullet \sum_{n\geq 1} \frac{n}{2^n}$$

**2** 
$$\sum_{n\geq 1} \left(a + \frac{1}{n}\right)^n, \quad a > 0.$$

$$\bullet \sum_{n\geq 1} \frac{1}{\sqrt{n}(n+1)}.$$

$$\bullet \sum_{n\geq 0} \frac{\cos^2(n)}{2^n}$$