SUBJECT MATTER

The chapter 6 "Differentiation" consists of two sections.

In the first section, we define and study the derivatives of real functions f of one real variable, i.e. of functions defined in a subset of $\mathbb{R}$, whose values belong to $\mathbb{R}$. In particular:

- the incremental quotient of f
- the derivative (or first derivative or differentiability) of f
- the geometric interpretation of the derivative
- differentiability and continuity
- derivative of the functions sum, product, quotient
- derivative of the composite function
- derivative of the inverse function
- derivatives and differentials of higher order
- linearization of a differentiable function
- mean value theorems
- functions with null derivative
- functions with derivative having constant sign
- necessary conditions for f to have a local extremum
- sufficient conditions for f to have a local extremum
- functions concave (or convex) at a point
- Taylor's formula
- point of inflexion for f

- oblique (or horizontal or vertical) asymptote for f
- functions convex in an interval
- L'Hospital's rule

In the second section, we define and study the partial derivatives of a real function f of several real variables, i.e. of a function defined in a subset of $\mathbb{R}^n$, whose values belong to $\mathbb{R}^n$. In particular:

- the partial derivative of the first order
- the partial derivative of order greater than 1
- Schwarz's theorem
- differential of a function at a point
- function differentiable at a point
- continuity of differentiable functions
- linearization of a differentiable function
- sufficient condition to differentiability
- derivative of the composite function
- directional derivative
- local extrema
- implicit functions.