

SUBJECT MATTER

The chapter 7 “Integration” consists of four sections.

In the first section, we define and study the integration of real functions f of one real variable, defined in intervals. In particular:

- the definite integral of f
- the geometric interpretation of the definite integral
- the basic properties of the definite integral
- the mean value theorem
- the fundamental theorem of the integral calculus
- the change of variable
- the integration by parts
- the improper integrals.

In the second section, we define and study the curvilinear integral. In particular:

- the vector-valued functions of several real variables
- their convergence
- their continuity
- their differentiability
- the curves of \mathbb{R}^n
- the scalar parametric equations

- the open regular curves
- the closed regular curves
- the open generally regular curves
- the closed generally regular curves
- the unit vector tangent
- the length of a regular curve
- the curvilinear abscissa
- the curvature of a curve
- the curvilinear integral
- the properties of the curvilinear integral
- the linear differential forms
- the curvilinear integral of the linear differential forms
- the circulation of a vector over a curve
- the conservative vector fields.

In the third section, we define and study the multiple integral. In particular:

- the measurable sets of \mathbb{R}^n
- the single-borderline regular plane domains
- the $(m + 1)$ -borderlines regular plane domains
- the plane regular domains normal with respect to x -axis
- the double integral
- the basic properties of the double integral
- the Fubini's theorem
- the Gauss' formula

- the divergence theorem
- the change of variables in double integrals
- the integration over non-bounded domains
- the triple integrals.

In the fourth section, we define and study the surface integral. In particular:

- the regular surfaces of \mathbb{R}^3
- the plane tangent to a regular surface
- the normal to plane tangent
- the area of a regular surface
- the surface integral
- the Stokes' theorem
- the vector version of the Stokes' theorem.