

Multivariable Calculus Overview

Vector-valued functions of one variable, space motion. Scalar functions of several variables: partial differentiation, gradient, optimization techniques. Double integrals and line integrals in the plane; exact differentials and conservative fields; Green's theorem and applications, triple integrals, line and surface integrals in space, Divergence theorem, Stokes' theorem; applications.

Functions of several variables, continuity, differentiability, derivative. Parametrized curves, arc length, curvature, torsion. Vector fields, gradient, curl, divergence. Multiple integrals, change of variables, line integrals, surface integrals. Stokes' theorem in one, two, and three dimensions.

References:

- Colley, Vector Calculus
- Shimamoto, Multivariable Calculus
- Munkres, Analysis on Manifolds
- Edwards, Advanced Calculus of Several Variables
- Buck, Advanced Calculus