
Mathematical analysis C

Programma

Curves in two or three dimensions.

Parametrisation and representation; tangent and normal vectors; tangent hyperplanes; length of a curve; integral of a function on a curve.

Functions in two variables

Graph, sections, level sets; paraboloids, cones, spherical and elliptic surfaces. Functions depending on one variable and radial functions.

Continuity and differentiability of functions of two or three variables.

Elements of topology; limits, continuity, Weierstrass theorem. Differentiability and partial derivatives, directional derivatives, gradient vector, steepest ascent, extremal points; extremal points on a curve; constrained extrema. Vector valued functions and Jacobian matrix.

Ordinary differential equations.

Linear differential equations of the first order, linear differential equations of higher order with constant coefficients; Cauchy problems.

Integral calculus of functions of two or three variables.

Multiple integrals over normal domains in two or three dimensions. Change of variables formula. Polar, spherical and cylindrical coordinates.

Vector fields.

Central fields. Integration of fields; conservative and curl-free fields.