

Linear algebra and calculus (S1)

Single Variable Calculus and Infinite series, Functions of more than one variable, Partial derivatives and its applications, Calculus of vector valued functions, Multiple Integrals.

Basic ideas of infinite series and convergence - Geometric series- Harmonic series- Convergence tests-comparison, ratio, root tests (without proof). Alternating series- Leibnitz Test-Absolute convergence, Maclaurin's series-Taylor series - radius of convergence.

Partial derivatives—Partial derivatives of functions of more than two variables - higher order partial derivatives - differentiability, differentials and local linearityThe chain rule – Maxima and Minima of functions of two variables - extreme value theorem (without proof)-relative extrema .

Introduction to vector valued functionsparametric curves in 3-space Limits and continuity – derivatives - tangent lines – derivative of dot and cross product-definite integrals of vector valued functionsunit tangent-normal- velocity-acceleration and speed– Normal and tangential components of acceleration. Directional derivatives and gradients-tangent planes and normal vectors

Double integrals in non-rectangular coordinatesreversing the order of integrationArea calculated as a double integralTriple integrals(Cartesian coordinates only)- volume calculated as a triple integral

Vector and scalar fields- Gradient fields – conservative fields and potential functions – divergence and curl - the ∇ operator - the Laplacian ∇^2 , Line integrals - work as a line integralindependence of path-conservative vector field

Green's Theorem (without proof- only for simply connected region in plane), surface integrals – Divergence Theorem (without proof for evaluating surface integrals), Stokes' Theorem (without proof for evaluating line integrals)