

MA101 (Part 3)

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Integration methods

1. Integration by substitution (change of variables), Integration by parts. Calculation of definite and indefinite integrals

Differential equations

1. First order linear homogenous and non-homogenous differential equations, Bernoulli's equation and Riccati equation.
2. Linear equations of second order homogenous and non-homogenous differential equations with constant coefficients.
3. Method of undetermined coefficients for determining a general solution of non-homogeneous differential equations.
4. Method of variation of parameters.

Approximation and root finding methods

1. Approximation of one variable functions by polynomials.
2. Fixed point and Newton methods for one real variable equation.

Properties of curves

1. Smooth parametric curves, Tangent line.
2. Local study of a parametric curve.
3. Length, Frenet frame and curvature.

Text books:

1. Tom M. Apostol, One variable calculus, with an introduction to linear algebra, Volume –I, Wiley, 2014.
2. M. K. Jain, S. R. K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, Wiley Eastern, 2003.
3. Maurice D. Weir, Joel Hass and Frank R. Giordano, Thomas' Calculus, Pearson, 2013.

References:

1. G. F. Simmons, Differential Equations with Applications and Historical notes, McGraw-Hill, 1991.
2. W. E. Boyce and R. C. Di-Prima, Elementary Differential Equations, John Wiley & Sons, 2000
3. E. A. Coddington, An introduction to Ordinary Differential Equations, PHI Learning, 1999.
4. Richard L Burden and Douglas Faires, Numerical Analysis, Thomson Books Cole, 2001.