

MT-615 Advanced Mathematical Physics

Tensor analysis: Introduction of tensor, Rank and order of a tensor, First and second order tensor, Algebraic operations on tensors, Contraction theorem, Symmetric and anti-symmetric tensors, Eigen value and Eigen vectors of a tensor.

Special Functions: Ber and Bei functions, Legenders functions of second kind, Rodrigues formula, Fourier-Legendre expansion, Legenders differential equation, Eigen function.

Transformations: Conformal transformation, Schwarz-Christoffel transformation, Liouville's theorem, Laurent's theorem, Integral transform, Solution of boundary value problems by using integral transform.

Matrices: Differentiation and integration of matrices, Sylvester's theorem, Non symmetric matrices with non-repeated Eigen values, Non symmetric matrices with repeated Eigen values, Symmetric matrices with non-repeated Eigen values, Symmetric matrices with repeated Eigen values.

Recommended Books:

1. Mathematical Methods in the Physical Sciences 3rd edition by Mary L. Boas . Year 2005
2. Mathematical Methods for Physicists, 7th Edition by George B. Arfken, Hans J. Weber and Frank E. Harris. Year 2013
3. Methods of Mathematical Physics, Volume 1, by Richard Courant and D. Hilbert. Year 2012