

MATHEMATICAL METHODS FOR PHYSICISTS

Chapter 1. VECTOR ANALYSIS

- *Definitions. Elementary Approach*
- *Rotation of the Coordinate Axes*
- *Scalar or Dot Product*
- *Vector or Cross Product*
- *Triple Scalar Product. Triple Vector Product*
- *Gradient*
- *Divergenc*
- *Curl*
- *Successive Applications of Gradient*
- *Vector Integration*
- *Gauss Theorem*
- *Stockes Theorem*
- *Potential Theory*
- *Gauss Law, Poisson Equation*
- *Dirac Delta Function*
- *Helmholtz's Theorem*
 - *Problems*

Chapter 2. COORDINATE SYSTEMS

- *Orthogonal Coordinates*
- *Special Coordinate Systems: Introduction*
- *Systems—Rectangular Cartesian Coordinates*
- *Circular Cylinder Coordinate*
- *Spherical Polar Coordinates*
- *Separation of Variables*
- *Problems*

Chapter 3. TENSOR ANALYSIS

- *Introduction, Definitions*
- *Contraction, Direct Product*
- *Quotient Rule*
- *Pseudotensors, Dual Tensors*
- *Dyadics*
- *Problems*

Chapter 4. DETERMINANTS and MATRICES

- *Determinants*
- *Matrices*
- *Orthogonal Matrices*
- *Hermitian Matrices. Unitary Matrices*
- *Diagonalization of Matrices*
- *Normal Matrices*
- *Problems*