

PH 534: COMPUTATIONAL LAB (0-0-6: 3)

1. Matrix addition, subtraction and multiplication
2. Transpose of a matrix
3. Roots of algebraic equations – Newton–Raphson method
4. Least-squares curve fitting – Straight-line fit and Exponential fit
5. Solution of simultaneous linear algebraic equations – Gauss elimination method
6. Solution of simultaneous linear algebraic equations – Gauss-Seidel method
7. Interpolation – Lagrange method
8. Numerical differentiation
9. Numerical Integration – Trapezoidal, Simpson and Gaussian Quadratures rules
10. Solution of ordinary differential equations – Runge-Kutta 2nd /4th order method
11. Uniform random number generation – Park and Miller method
12. Gaussian random number generation – Box and Muller method
13. Monte Carlo simulation of radioactive decay

Text Books and References:

1. G. L. Squires, "Practical Physics", Cambridge University Press.
2. V. Rajaraman, "Computer Oriented Numerical Methods", PHI Learning Publishers.
3. H. M. Antia, "Numerical Methods for Scientists and Engineers", Hindustan Book Agency.
4. K. P. N. Murthy, "Monte-Carlo Methods in Statistical Physics", University Press.