Major CHL 260

Time 2 hours. **4th May 2009** (8 A.M to 10 A.M) **Max. Marks: 50**

Attempt all Questions

Q1.Describe the Jacobi Method for symmetric matrices, find the Eigenvalues and their corresponding Eigen vectors. Suggest the alternative method and steps used to overcome the problems faced in the Jacobi Method. (7,3)

Q2. Find all the roots of the polynomial equation

$$F(x) = x^4 - 2x^3 + 4x^2 - 4x + 4 = 0$$

Using Newton-Bairstow Method with starting values (1,-1), show the computation of all the steps clearly. (10)

Q3. Answer the following:

(a) Name any four methods for solving the Linear system of algebraic equations Ax = b, and the formula used for solving the linear system of equations. Mention which of them are **Direct or Iterative** methods. (4)

(b) Explain the term **orthogonal** matrix and **diagonally dominant** matrix. (1)

(c)Derive the order of convergence of the secant method. (5)

Q4. A furnace wall 1 ft thick is at 100 initially. The left face is raised to 500 and thereafter maintained at that temperature. Write a program in C or MATLAB to print and plot the temperature profiles for 25Δt and 100Δt times when the right wall is insulated and label these curve as 25 and 100 respectively.

The heat equation is

$$\frac{\partial T}{\partial t} = 0.01 \frac{\partial^2 T}{\partial x^2}$$

take $\Delta x = 0.05$ and find Δt for stability. (10)

Q5. (a) Write a function getbits (x, p, n) in C which returns (right adjusted) the n-bit field of x that begins at position p. Assume bit position 0 at the right end and n, p and x are sensible positive integer values. Create a pointer to this function and invoke through the pointer function in main for 25167, 7, 5 values of x, p, n respectively. (7)

(b) Turbo_C allocates 2 bytes to the type INTEGER, while Gcc allocates 4 bytes. Write a preprocessor statements so that INTEGER is seen the same for both the compilers. Assume the identifier Turbo_C is defined. (3)