3rd year lab assignment 2023  
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1. (a) Print the root of the equation a x2 +b x +c = 0 (a ≠ 0) where a, b, c are any real numbers.  
   (b) Compute the value of e5 and e1.5 with the help of sum of 5 terms of series e5.  
   (c) Find prime numbers from 1 to 400. The output should have 4 numbers in each line.  
   (d) Calculate the value of Pi from 500 term of the series   
   (e) write a Fortran program to estimate the value of π up to 6 decimal place by adding the first 50 terms   
   (f) write a Fortran program to find first 30 terms of Fibonacci sequence. The output should have 5 numbers in a line.
2. (a) A function f(x) is defined by . Compute f(x), x ∈ [-10,10] at an interval of 0.5  
   (b) Find the minimum value of f (x, y) = x2 + y2 -2x -6y +14 in the window [0,2] x [2,4] with increment 0.01 for x and y
3. Using  
   (i) Newton-Raphson method  
   (ii)Fixed Point Iteration method  
    to find the root of the equation x3-3x – 5 = 0 correct upto five decimal places. Show your result in a tabular form with proper headings. Input x0 = 2.0
4. Use   
   (i) Gauss - Seidal method  
   (ii) LU Factorization method  
   (iii) SOR iterative method  
   (iv) Gauss – Jordan Method  
   (v) Jacobi Iterative Method  
   (vi) Gauss elimination Method  
    to solve the following system of linear equations correct upto four decimal places.
5. Compute by  
   (i) Simpson’s 1/3 rule   
   (ii) Simpson’s 3/8 rule   
   (iii) Trapezoidal rule   
   and compare your result to exact value.
6. (a) Every year Tk. 12000 is deposited in a saving account in 1567 which yield 5% interest compounded annually. Write a program which prints account number and amount in the account after 10 years.  
   (b) Print all the odd positive integers **≤** n, omitting those are divisible by 3 and 5. The output should have five numbers in each line.  
   (c) Read a positive integer N >= 10, Print all even positive integer from 1 to N with three numbers to a line, omitting those divisible by 5. Determine whether N is prime or not. If N is not prime, then print all the divisors.
7. For Romberg integration to approximate the value of the integral correct upto five decimal places. Compare your result with the exact value 0.0887553. Show your result in a tabular form.
8. Using the data (300,2.4771), (304,2.4829), (305,2.4843), (307,2.4871). find the result for f (301) For  
   (i) Lagrange interpolation formula  
   (ii) Newton’s divided difference interpolation formula  
   (iii) Newton’s backward difference formula
9. Find the dominant eigen value and the corresponding eigenvector of the following matrix:  
   with X(0) =
10. Solve the following IVP using subroutine subprograms for   
      
    (i) R-K 2nd order method  
    (ii) R-K 4th order method  
    (iii) Euler’s method  
    (iv) Modified Euler’s method  
    (v) Adams Bashforth  
    to approximate the solution of the IVP: y’ = y- t2+ 1, 0 ≤ t ≤ 2, y (0) = 0.5 with h=0.1. Hence compare your result with the actual solution y(t) = (t+1)2 – 0.5 et
11. Minimization, set 4, 21
12. Fxy (0,0), set 1, 21
13. Matrix Multiplication