

Assignment-6

Jason

D1228792

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When doing the homework, I have met some problems.

I didn't know what is operator in the beginning. However, after asking Jack for helping I realize and finish the code.

I didn't know the concept of inherent. I searched online and finally realized.
program steps:

This C++ program solves a system of linear equations by using matrix operations and determinants. It starts by including necessary headers for matrix and vector operations and standard libraries for input-output, random number generation, and time manipulation. The program uses the srand function to seed the random number generator with the current time.

The main function begins by declaring matrix objects and other variables. The user is prompted to input the rank n of the system, which must be between 1 and 10. The program sets up a $n \times n$ coefficient matrix m with random values between 0.0001 and 1.0000. These values represent the coefficients of the linear equations.

Next, the constant vector equ is initialized with random values and printed. This vector represents the right-hand side of the linear equations. The program then displays the full system of linear equations by combining the coefficients from the matrix m and the constants from the vector equ .

To solve the system, the program uses determinants. It creates an `SMatrix` object from the matrix m to compute its determinant. For each variable, the program replaces the corresponding column of the coefficient matrix with the constant vector and calculates the determinant of this new matrix. The solutions are stored in the vector x .

Finally, the program prints the solution vector x and verifies the solution by substituting the values back into the original equations. It checks each equation to ensure that the computed solution satisfies it within a small tolerance. If the solution is correct, it prints that the equation passes; otherwise, it prints that the equation does not pass.

In summary, the program demonstrates setting up and solving a system of linear

equations using matrix operations, specifically focusing on the use of determinants to find the solutions and verify their accuracy.