**INTEGRAL THE FUNCTİON BY USİNG TRAPEZOİD RULE**

INF 211

Algorithms and Programming

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Prepared by

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**Evaluation**

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| Report layout /Rapor düzeni | 10 |
| Flowchart /Akış Diyagramı | 5 |
| Programming /Programlama  Loops, conditional statements, arrays, functions, \*.h and \*.c files, pointers, structures must be in code. Program must be constructed in logical and correct way. | 50 |
| Presentation / Sunum | 10 |
| Questions / Sorular | 25 |

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| Project Objective /Projenin Amacı |
| In mathematics, and more specifically in numerical analysis, the trapezoidal rule (also known as the trapezoid rule or trapezium rule) is a technique for approximating the definite integral. The trapezoidal rule works by approximating the region under the graph of the function as a trapezoid and calculating its area. Purpose of project creating a program with DEV C++ which can solve integral with trapezoidal rule. |
| Description of Problem / Problem Tanımlama |
| A number of definite integrals need to be solved in applied mathematics, physics and engineering. The manual analytical solution of definite integrals is quite cumbersome and time consuming. So, in this project we have presented source code in C program for Trapezoidal method as one of the computer-programming-based solutions of definite integrals. The techniques of numerical methods are used to solve this equation; it involves a number of calculations and efforts have been made to minimize error in the program. |
| **Description of Method / Metodunun Tanımlaması** |
| The trapezoid rule is a numerical integration method, that is, a method to calculate approximately the value of the definite integral. The rule is based on approximating the value of the integral of f(x) by that of the linear function that passes through the points (a, f (a)) and (b, f (b)). So in this project, we are using for and while loops, if and else decision structures and functions. The rule which we are using: |
| Text of Program/ Programın Kodunu Tanımlaması |
| The code is in the last page. |
| User’s guide / Kullanıcı Rehberi |
| **USING OF THE PROGRAM:**  Firstly, the program wants to function. User gives the function and then, program want to initial limit, final limit and sub interval. Finally, the program displays to user’s function’s coefficients, powers and constant number. Then, it shows the answer of integral.  **POSSIBLE LIMITATIONS:**   * User must to use small letter. * Even x’s power is 1, user must enter the power like that x^1.   **POSSIBLE ERRORS:**  While user obey the limitations, program works correctly. |
| Results of the solution / Programın Sonuçları |
| Flowchart of the Program / Programın Akış Diyagramı |
|  |
| Conclusion and Remarks / Sonuç ve Notlar |
| First, we think that to define function in code. But then, we think it’s too easy. So, we are taking the function by user. Analyzing the function was so hard for us. We wasted very time. We overcame this problem thanks to some references on internet. Purpose of using complex codes is we wanted to create user friendly program. While user obey the limitations, program works correctly. Already, the program does not have to many limitations. So, users can use very easily to the program. They just enter the function, limits and sub intervals. We improved our knowledge of function structures, loops and decision structures. We learned building complex codes thanks to this program. We used nested loops and structures. So that, we had hard times while we had building flowchart but we overcame this problem too. We think about this project was very beneficial for us. |
| References / Kaynaklar |
| * [www.dev.to](http://www.dev.to) * [www.wikipedia.org](http://www.wikipedia.org) * [www.muzafferkadir.com](http://www.muzafferkadir.com) * [www.draw.io](http://www.draw.io) * [www.math24.com](http://www.math24.com) * [www.splashlearn.com](http://www.splashlearn.com) * [www.codewithc.com](http://www.codewithc.com) * [www.youtube.com/fuatserkanorhan](http://www.youtube.com/fuatserkanorhan) * [www.mathwords.com](http://www.mathwords.com) * [www.dummies.com](http://www.dummies.com) * [www.intmath.com](http://www.intmath.com) * [www.web.boun.edu.tr](http://www.web.boun.edu.tr) * [www.vivaxsolutions.com](http://www.vivaxsolutions.com) * [www.math.ucla.edu](http://www.math.ucla.edu) * [www.lucidchart.com](http://www.lucidchart.com) * [www.bilgigunlugum.net](http://www.bilgigunlugum.net) * [www.technoprogram.com](http://www.technoprogram.com) |