

Programming Exercise 2

Group 1

Report

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gaussq_n.m computes the the Gauss-Quadrature of an integral in interval $[a,b]$ with n grid points. First it defines an empty $n \times n$ matrix. Then with the help of for loop it computes the symmetric tridiagonal matrix with the given formula from the pdf of exercise explanation. Then it computes the eigenvalues and the eigenvectors of A . Then we get the diagonal values of eigenvalue matrix and assign them to x . Then we compute the weighs of Gauss-Quadrature with the formula given from the pdf file. We then define our input data for all a and b and not only for -1 and 1 . Now we are ready to apply the function f to all values of y array with the help of arrayfun function. And at the end we just assign all the values we got to the final Gauss-Quadrature formula by iterating with for loop.

gaussq_tol.m finds the required number of grid points n to achieve some tolerance by iteration to the formula $|Q(n+1) - Q(n)| \leq \text{tol}$ and then applies gaussq_n.m with this number of grid points.

In the **main.m** we define the needed tests for these two scripts. First row in each example gives Gauss Quadrature with input of n . Second row in each example gives:

[Gauss Quadrature with input of tol , n to achieve this tol]

The functions can be run as sections

For output delete the semicolons