MA322: Scientific Computing
Lab Assignment 6

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Q1.b) For the Gaussian-Legendre formula,
$w(x) = 1$
$w_1 = w_2 = 1$
$x_1 = 1/\sqrt{3}$; $x_2 = -1/\sqrt{3}$
where w(x) is the weight function,
w_1 and w_2 are the weights, and x_1 and x_2 are the roots of the Gaussian-Legendre equation.

Q1.c) For the Gaussian-Chebyshev (1st kind) formula,
$w(x) = 1/\sqrt{(1-x^2)}$
$w_1 = w_2 = 1.570796327$
$x_1 = 1/\sqrt{2}$; $x_2 = -1/\sqrt{2}$
where w(x) is the weight function,
w_1 and w_2 are the weights,
and x_1 and x_2 are the roots of the Gaussian-Chebyshev (1st kind) equation.

For the Gaussian-Chebyshev (2nd kind) formula,
$w(x) = \sqrt{(1-x^2)}$
$w_1 = w_2 = 0.7853981634$
$x_1 = 1/2$; $x_2 = -1/2$
where w(x) is the weight function,
w_1 and w_2 are the weights,
and x_1 and x_2 are the roots of the Gaussian-Chebyshev (2nd kind) equation.

The following is the output : -

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Integral using Gaussian-Legendre formula = 0.665844
Analytical Integral = 0.663494
Relative Error = 0.003541

Integral using Gaussian-Chebyshev (1st kind) formula = 1.566434
This is non-integrable

Integral using Gaussian-Chebyshev (2nd kind) formula = 0.392426
This is non-integrable
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