# Scientific Computing (MA322)

# Lab 09

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Q1 Gauss-Lobatto Integration
Part (i) integration with n = 2: 7.119008e+02
Part (i) actual integration with n = 2: 1.922594e-01
Part (i) integration error with n = 2: 1.252334e+03

Part (ii) integration with n = 2: 9.052914e-01
Part (ii) actual integration with n = 2: -1.768200e-01
Part (ii) integration error with n = 2: 1.082111e+00

Q1 Gauss-Lagrange (Newton Cotes) Integration
Part (i) integration with n = 2: 2.280741e-01
Part (i) actual integration with n = 2: 1.922594e-01
Part (i) integration error with n = 2: 3.581477e-02

Part (ii) integration with n = 2: -1.777643e-01
Part (ii) actual integration with n = 2: -1.768200e-01
Part (ii) integration error with n = 2: 9.443255e-04

Q2 Gauss-Lobatto Integration
Part (i) integration with n = 2: 7.119008e+02
Part (i) actual integration with n = 2: 2.588629e+00
Part (i) integration error with n = 2: 1.250974e+03

Part (ii) integration with n = 2: 9.052914e-01
Part (ii) actual integration with n = 2: -7.339692e-01
Part (ii) integration error with n = 2: 1.639261e+00

Q2 Gauss-Lobatto Integration
Part (i) integration with n = 3: 4.518920e+02
Part (i) actual integration with n = 3: 2.588629e+00
Part (i) integration error with n = 3: 8.849102e+02

Part (ii) integration with n = 3: -4.777601e+00
Part (ii) actual integration with n = 3: -7.339692e-01
Part (ii) integration error with n = 3: 4.043632e+00

Q2 Gauss-Lobatto Integration
Part (i) integration with n = 4: 4.529908e+02
Part (i) actual integration with n = 4: 2.588629e+00
Part (i) integration error with n = 4: 8.854686e+02

Part (ii) integration with n = 4: -4.773233e+00
Part (ii) actual integration with n = 4: -7.339692e-01
Part (ii) integration error with n = 4: 4.039264e+00

Q2 Gauss-Lobatto Integration
Part (i) integration with n = 5: 4.530331e+02
Part (i) actual integration with n = 5: 2.588629e+00
Part (i) integration error with n = 5: 8.854901e+02

Part (ii) integration with n = 5: -5.101959e-01
Part (ii) actual integration with n = 5: -7.339692e-01
Part (ii) integration error with n = 5: 2.237733e-01

Q2 Gauss-Lagrange (Newton Cotes) Integration
Part (i) integration with n = 2: 4.143260e+00
Part (i) actual integration with n = 2: 2.588629e+00
Part (i) integration error with n = 2: 1.554631e+00

Part (ii) integration with n = 2: -8.666667e-01
Part (ii) actual integration with n = 2: -7.339692e-01
Part (ii) integration error with n = 2: 1.326975e-01

Q2 Gauss-Lagrange (Newton Cotes) Integration
Part (i) integration with n = 3: 2.583696e+00
Part (i) actual integration with n = 3: 2.588629e+00
Part (i) integration error with n = 3: 4.932229e-03

Part (ii) integration with n = 3: -7.391053e-01
Part (ii) actual integration with n = 3: -7.339692e-01
Part (ii) integration error with n = 3: 5.136164e-03

Q2 Gauss-Lagrange (Newton Cotes) Integration
Part (i) integration with n = 4: 2.585789e+00
Part (i) actual integration with n = 4: 2.588629e+00
Part (i) integration error with n = 4: 2.839581e-03

Part (ii) integration with n = 4: -7.364277e-01
Part (ii) actual integration with n = 4: -7.339692e-01
Part (ii) integration error with n = 4: 2.458521e-03

Q2 Gauss-Lagrange (Newton Cotes) Integration
Part (i) integration with n = 5: 2.587968e+00
Part (i) actual integration with n = 5: 2.588629e+00
Part (i) integration error with n = 5: 6.601757e-04

Part (ii) integration with n = 5: -7.341567e-01
Part (ii) actual integration with n = 5: -7.339692e-01
Part (ii) integration error with n = 5: 1.874933e-04

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Q3 Gauss-Legendre Integration
Part (i) integration with $n = 2$: 6.658437e-01
Part (i) integration with $n = 4$: 6.634934e-01
Part (ii) integration with $n = 2$: 1.962973e+00
Part (ii) integration with $n = 4$: 1.933417e+00

Q4 Gauss-Legendre Integration
Part (i) integration with $n = 2$: 7.465947e-01
Part (i) integration with $n = 4$: 7.468245e-01
Part (i) integration with $n = 6$: 7.468241e-01
Part (ii) integration with $n = 2$: 1.263158e+00
Part (ii) integration with $n = 4$: 2.047285e+00
Part (ii) integration with $n = 6$: 2.411689e+00