==

Grid size: 11x11

Grid spacing: dx = 0.1, dy = 0.1

Program execution started....

Iteration = 0, Convergence error = 6.770e+00, L1 error = 8.583e+00

VTK document output: steady_diffusion_2D_10x10_000000.vtk

Steady state reached, temperature field converged!!

Final iteration: 273, Convergence error: 9.719e-07

Final L1 error: 3.222e-02

VTK document output: steady_diffusion_2D_10x10_000273.vtk

Grid size 10x10 computation completed

==

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Grid size: 21x21

Grid spacing: dx = 5.000e-02, dy = 5.000e-02

Program execution started....

Iteration = 0, Convergence error = 6.719e+00, L1 error = 9.371e+00

VTK document output: steady_diffusion_2D_20x20_000000.vtk

Steady state reached, temperature field converged!!

Final iteration: 988, Convergence error: 9.924e-07

Final L1 error: 1.756e-02

VTK document output: steady_diffusion_2D_20x20_000988.vtk

Grid size 20x20 computation completed

==

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Grid size: 41x41

Grid spacing: dx = 2.500e-02, dy = 2.500e-02

Program execution started....

Iteration = 0, Convergence error = 6.693e+00, L1 error = 9.775e+00

VTK document output: steady_diffusion_2D_40x40_000000.vtk

Iteration = 1000, Convergence error = 2.326e-03, L1 error = 2.982e-01

Iteration = 2000, Convergence error = 1.061e-04, L1 error = 1.224e-02

Iteration = 3000, Convergence error = 4.843e-06, L1 error = 8.609e-03

Steady state reached, temperature field converged!!

Final iteration: 3511, Convergence error: 9.999e-07

Final L1 error: 9.032e-03

VTK document output: steady_diffusion_2D_40x40_003511.vtk

Grid size 40x40 computation completed

==

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Grid size: 81x81

Grid spacing: dx = 1.250e-02, dy = 1.250e-02

Program execution started....

Iteration = 0, Convergence error = 6.680e+00, L1 error = 9.980e+00

VTK document output: steady_diffusion_2D_80x80_000000.vtk

Iteration = 1000, Convergence error = 5.021e-03, L1 error = 3.125e+00
Iteration = 2000, Convergence error = 2.707e-03, L1 error = 1.429e+00
Iteration = 3000, Convergence error = 1.260e-03, L1 error = 6.585e-01
Iteration = 4000, Convergence error = 5.828e-04, L1 error = 3.025e-01
Iteration = 5000, Convergence error = 2.695e-04, L1 error = 1.380e-01
VTK document output: steady_diffusion_2D_80x80_005000.vtk
Iteration = 6000, Convergence error = 1.246e-04, L1 error = 6.219e-02
Iteration = 7000, Convergence error = 5.763e-05, L1 error = 2.753e-02
Iteration = 8000, Convergence error = 2.665e-05, L1 error = 1.212e-02
Iteration = 9000, Convergence error = 1.232e-05, L1 error = 5.803e-03
Iteration = 10000, Convergence error = 5.699e-06, L1 error = 3.771e-03
VTK document output: steady_diffusion_2D_80x80_010000.vtk
Iteration = 11000, Convergence error = 2.636e-06, L1 error = 3.692e-03
Iteration = 12000, Convergence error = 1.219e-06, L1 error = 4.137e-03
Steady state reached, temperature field converged!!
Final iteration: 12257, Convergence error: 9.996e-07
Final L1 error: 4.225e-03
VTK document output: steady_diffusion_2D_80x80_012257.vtk
Grid size 80x80 computation completed
==
Data file output: grid_convergence_data.dat
Gnuplot script output: plot_convergence.plt
=== Grid Convergence Analysis ===
Linear regression results:
Slope = 0.975 (理論值應接近 2.0)
Intercept = -1.153
Order of accuracy = 0.975
Correlation coefficient R = 0.9987
R² = 0.9974
To generate the plot, run: gnuplot plot_convergence.plt
======================================
VTK document output: Analytical_solution_80x80_000000.vtk
All computations completed!