6220HW3

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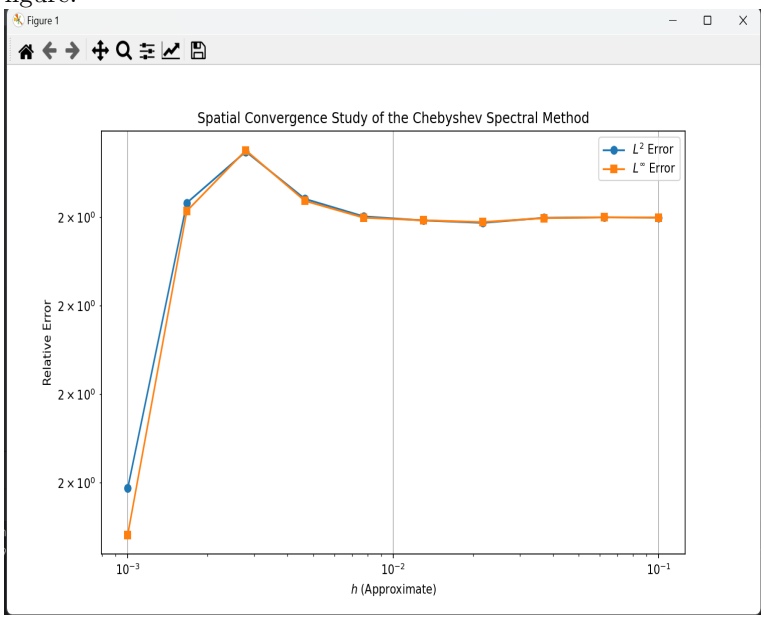
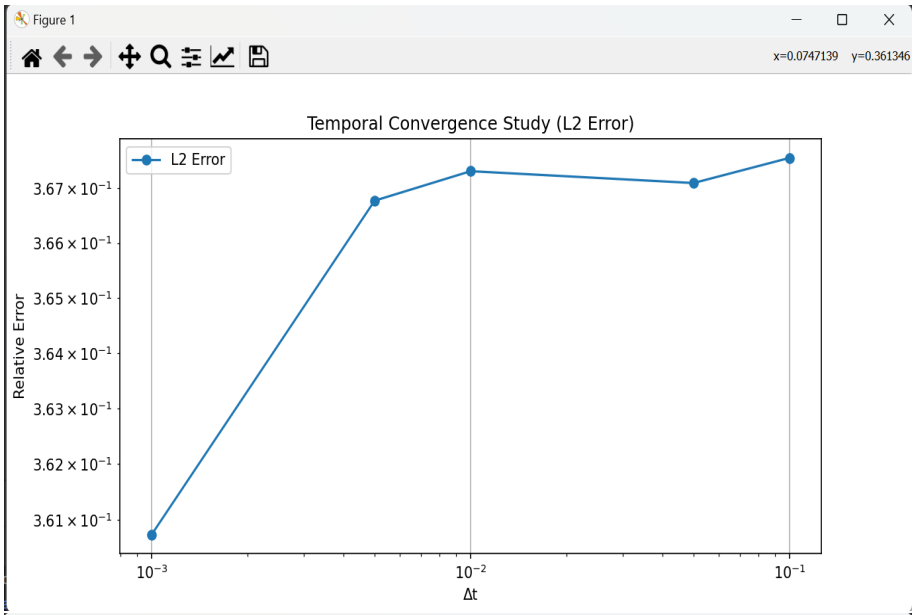
1 problem1

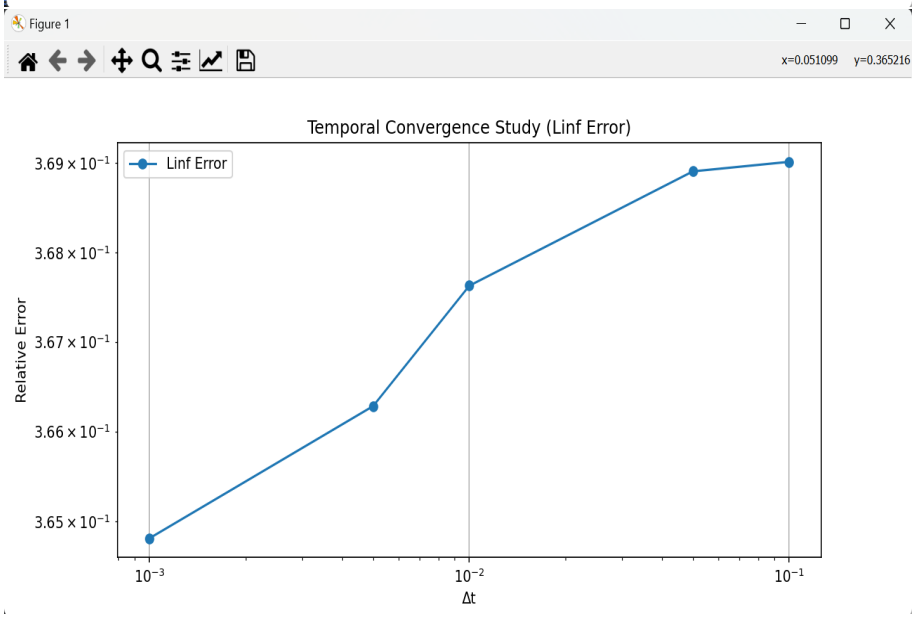
figure:



2 problem2

question(a):
figure:





question(b):
figure:

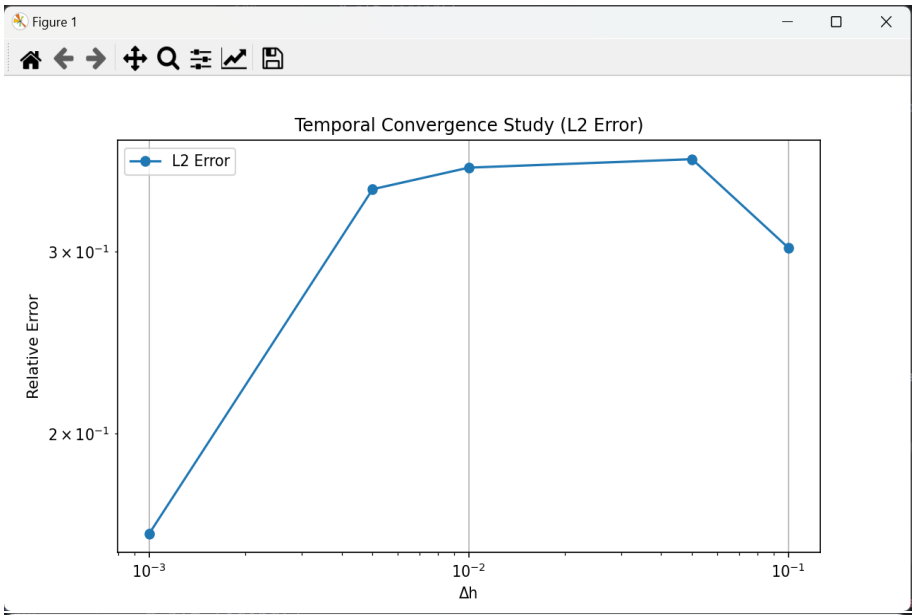


Figure 1
Temporal Convergence Study (L2 Error)
L2 Error
Relative Error
3×10^{-1}
2×10^{-1}
10^{-3}
10^{-2}
10^{-1}
Δh

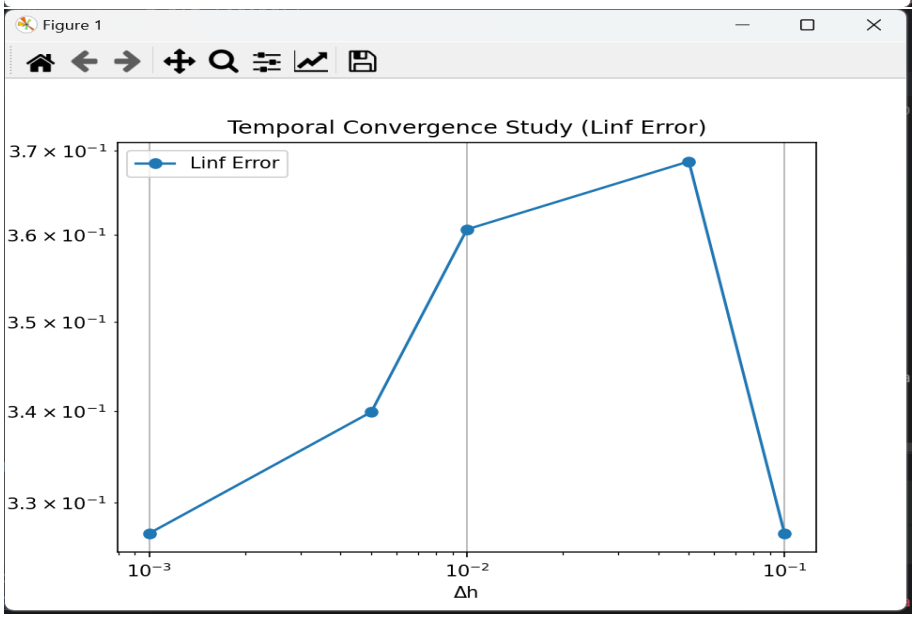
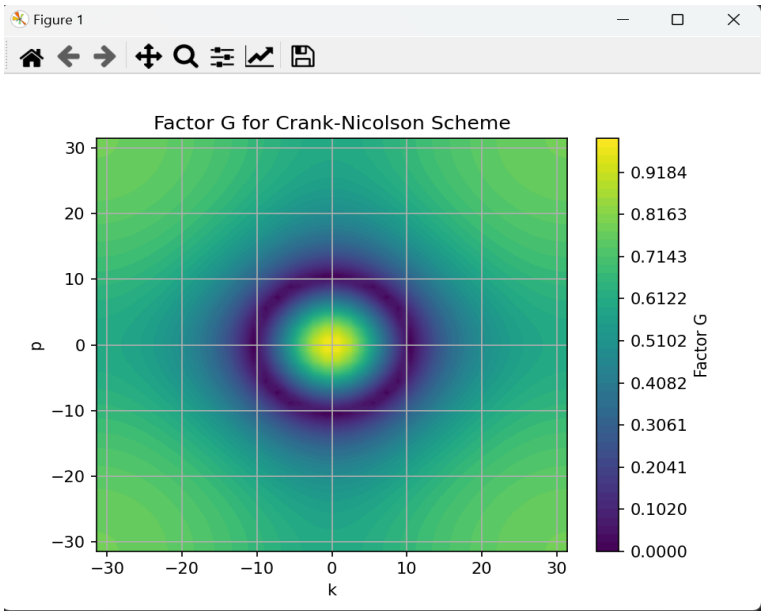


Figure 1
Temporal Convergence Study (Linf Error)
Linf Error
3.7×10^{-1}
3.6×10^{-1}
3.5×10^{-1}
3.4×10^{-1}
3.3×10^{-1}
10^{-3}
10^{-2}
10^{-1}
Δh

3 problem3



From the figure above, we can see that the factor G is about less and equal to 1, which can show the unconditional stability of the 2d heat equation in Crank-Nicolson scheme.