

Progress Report

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Numerical solution for 2D heat transfer

A C++ code was written to solve the problem of 2D heat transfer. Forward in time center in space (FTCS) method was used with the following formula:

$$T_i^{n+1} = T_i^n + \Delta t \alpha \left(\frac{\partial^2 T}{\partial x^2} + \frac{\partial^2 T}{\partial y^2} \right) \quad (1)$$

A time step of 0.001 was utilized with 200 grid intervals in both x and y directions.

Initial condition was $T_i = 25^\circ C$.

Boundary conditions for the first case were selected as follows:

1. $T_{xi} = 25^\circ C$ at $x = 0$
2. $T_{xf} = 25^\circ C$ at $x = L$
3. $T_{yi} = 25^\circ C$ at $y = 0$
4. $T_{yf} = 50^\circ C$ at $y = L$

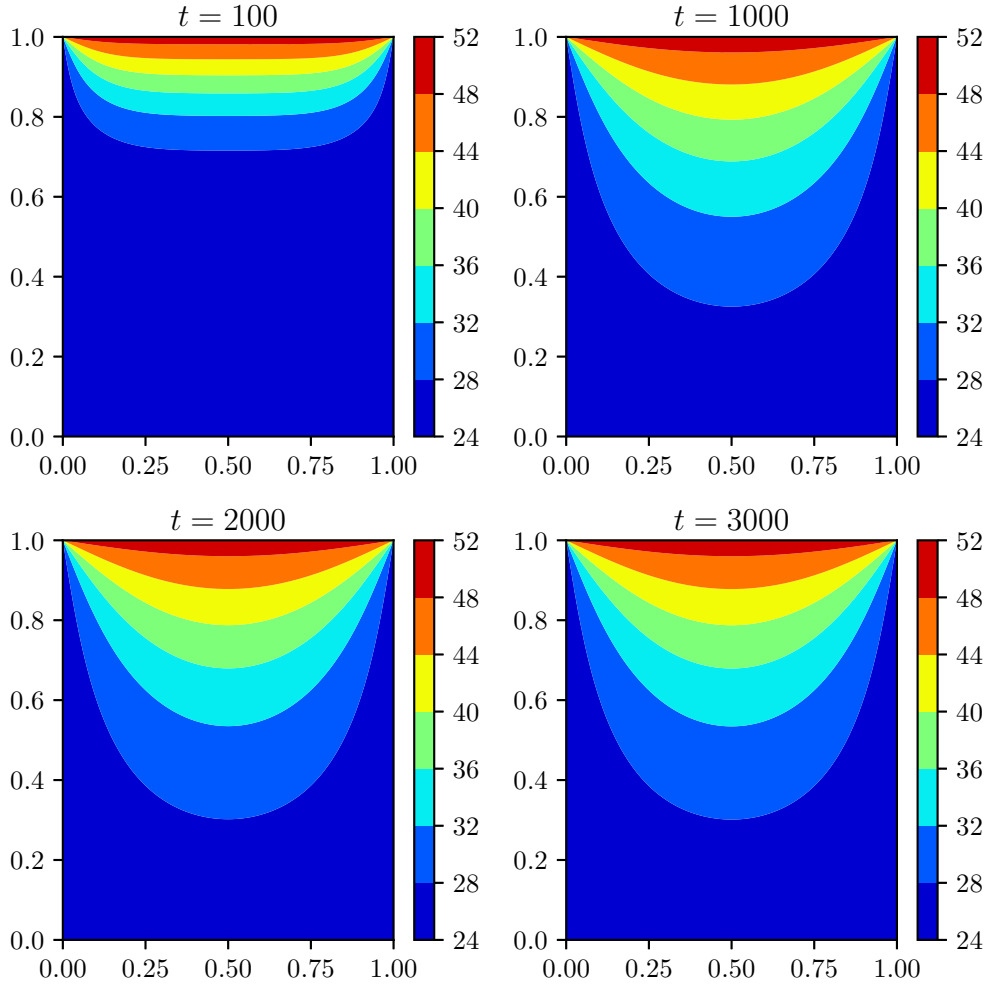


Figure 1: Plots for the first case with various values of time (time step of 0.001).