Point Source Heat Diffusion Simulated In Python With Customizable Discretized Bodies

Max Mandel

PHYS 25000: Computational Physics, University of Chicago

Autumn 2024

Introduction

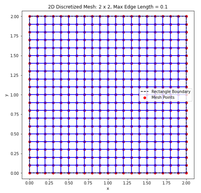
Add your information, graphs and images to this section.

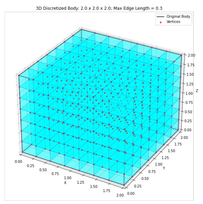
Project Statement

Add your information, graphs and images to this section.

Discretization & Meshing

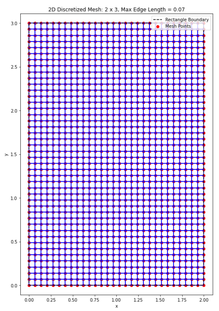
Add your information, graphs and images to this section.

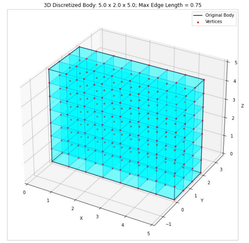


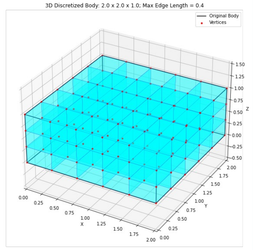


Implementation

Add your information, graphs and images to this section.

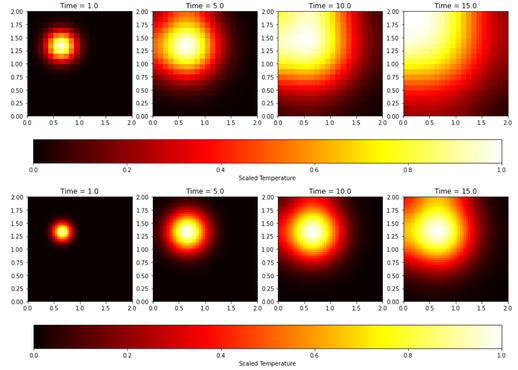




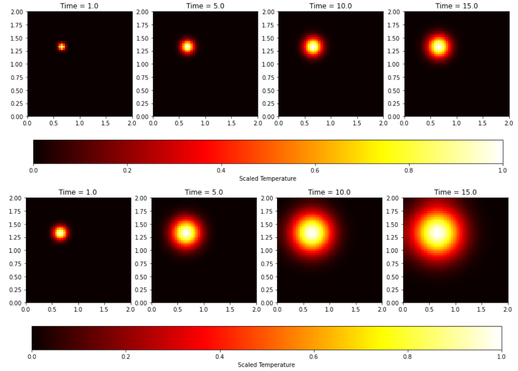


Examples & Results

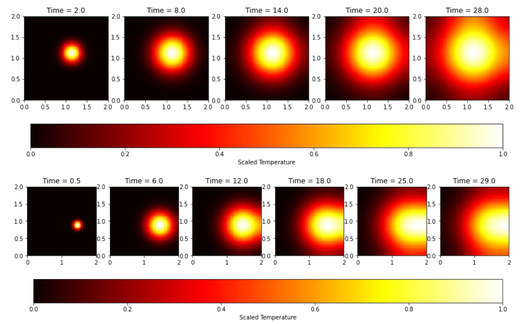
Impact of improved mesh refinement on simulation results



Impact of greater thermal diffusivity constant on simulation results in 2 dimensions (Steel, Aluminum, ~5x larger thermal diffusivity constant)

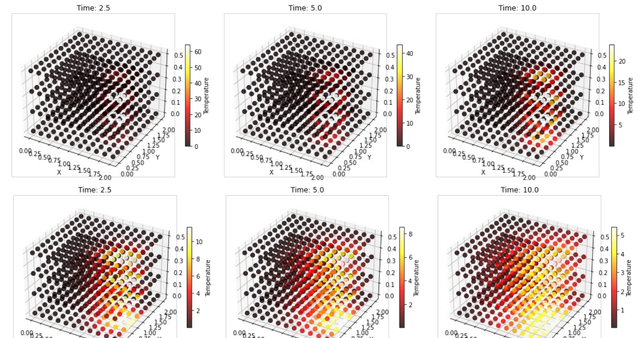


Demo: longer timescales, additional snapshots, modified heat source, greater thermal diffusivity (copper)

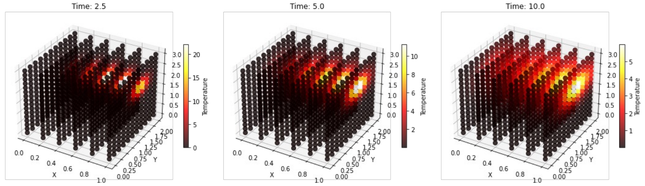


3D Extension

Impact of greater thermal diffusivity constant on simulation results in 3 dimensions (Steel, Copper, ~10x larger thermal diffusivity constant)



Demo: modified thermal diffusivity, body, and discretization



Errors, Limitations, and Further Improvement

Add your information, graphs and images to this section.

Citations and Acknowledgements

Add your information, graphs and images to this section.