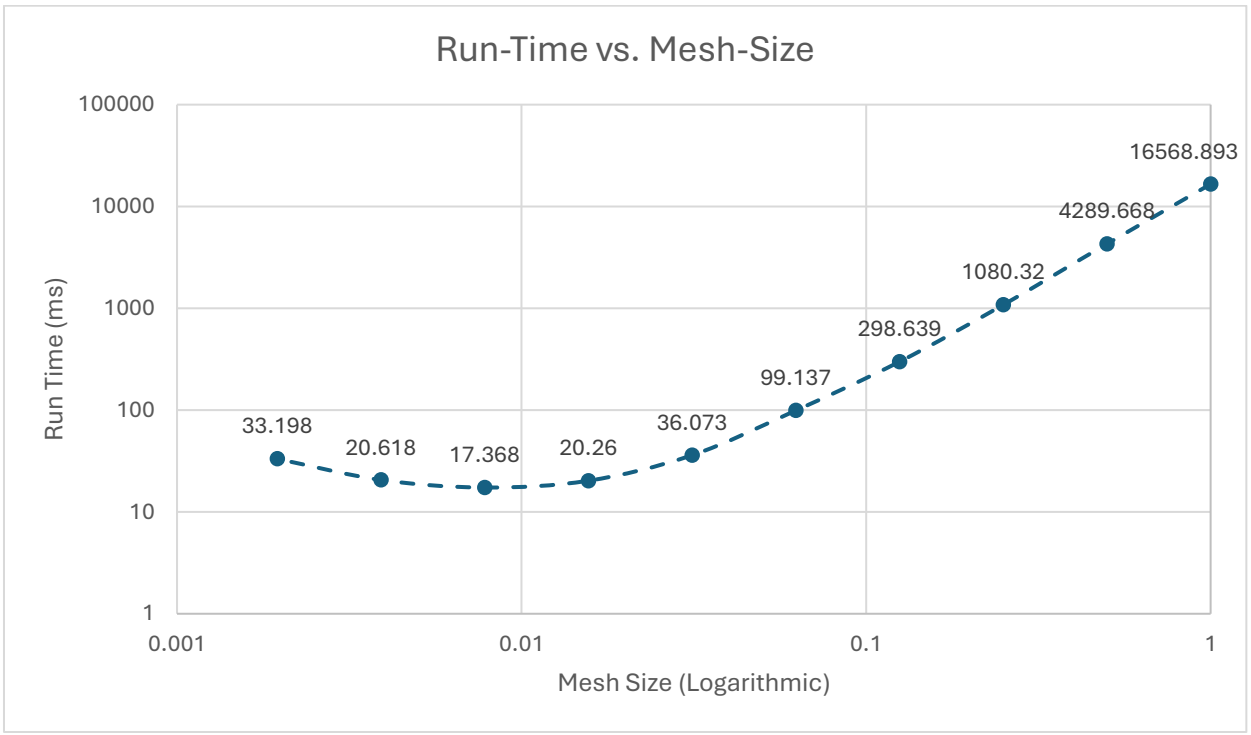
Simulation und wissenschaftliches Rechnen 2 [SiWiR2]

Assignment 3 – Bonus Task Report

The following is a graph of overall runtime(in milliseconds) of the interpolation with various sized auxiliary grids. The size is defined as $1/(2^h)$ where h is {0,1,2,3,4,5,6,7,8,9}. The graph shows a clear trend between auxiliary mesh size (h) and runtime of the interpolation code.

A smaller auxiliary mesh size (higher h) creates a denser grid with a much larger number of cells. The assignment of INGRID to the cells of the auxiliary grid, therefore takes longer.

However, with a larger sized auxiliary grid (lower h), we have more cells of the INGRID corresponding to each cell of the auxiliary grid, therefore, the interpolation phase takes longer because there are more triangles to go through in each cell.



Graph 1.0 Run-Time vs. Mesh Size

In conclusion, based on the number of nodes and their density in the INGRID, there is an optimal auxiliary grid size. In this case we can see that the h=7 is the optimal size for our mesh_finest_in.vtk.

Choosing the optimal mesh size involves balancing the computational load of filling the auxiliary grid and interpolating. In practice, you might need to experiment with different auxiliary mesh sizes to find the optimal size for each INGRID.