

APC 524 / AST 506 / MAE 506 Software  
engineering for scientific computing  
Assignment 4: Parallel programming with  
OpenMP and MPI

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November 19, 2016

## 1 Comparison of serial, OpenMP, and MPI

### 1.1 Single thread, Serial, OpenMP, MPI

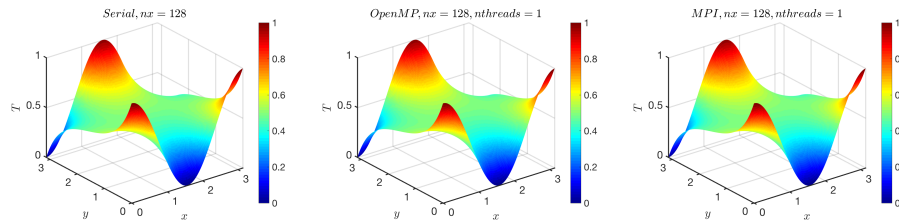


Figure 1: Temperature field computed by serial, OpenMP, and MPI with a single thread, grid size  $128 \times 128$

### 1.2 Multiple thread, OpenMP

### 1.3 Multiple thread, MPI