

# Summary Report

Poisson equation is solved in 2D structured grid with overlapping rectangular blocks using jacobi method. The code is written in C. For message passing MPI is used. Specific dirichlet boundary conditions are maintained.

Equation solved:  $\nabla^2 \Phi = c \rho$

Length of 2D domain= -1.00 to 1.00 in both X and Y direction.

Boundary conditions: left=-1,right=1

top bottom=(1-eta)\*-1+eta\*1

eta=(x-xmin)/(xmax-xmin);

Solution approach: Jacobi iteration

Grid used: 32X32

Partition Approach:

The following figure shows the partition approach

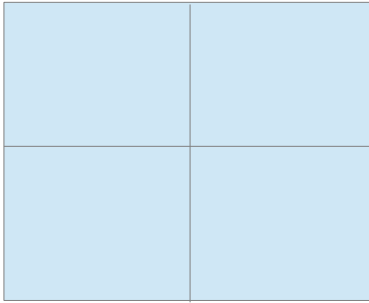
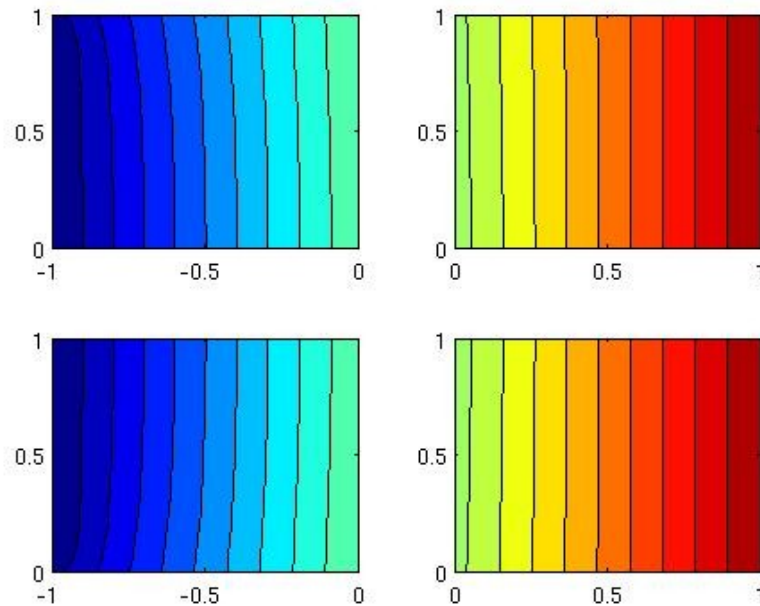
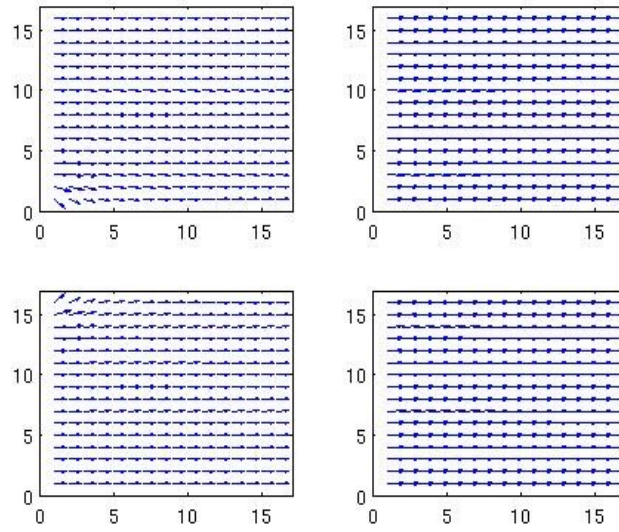


Figure 1: partition of the domain in different processes

Result:



(a) Contour plot of the solution



(b) Gradient of the solution

Figure 2. Results obtained from the solution.

The code was run in the gmice cluster however it was giving an error related to math.h. So it refused to compile over there. Afterwards, the code was ran in my personal laptop under debian ubuntu with gcc,icc compiler. The results presented are obtained from runs performed in my laptop.