Simulation and Scientific Computing 2

Assignment 1: Multigrid Methods

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**Team Members :**

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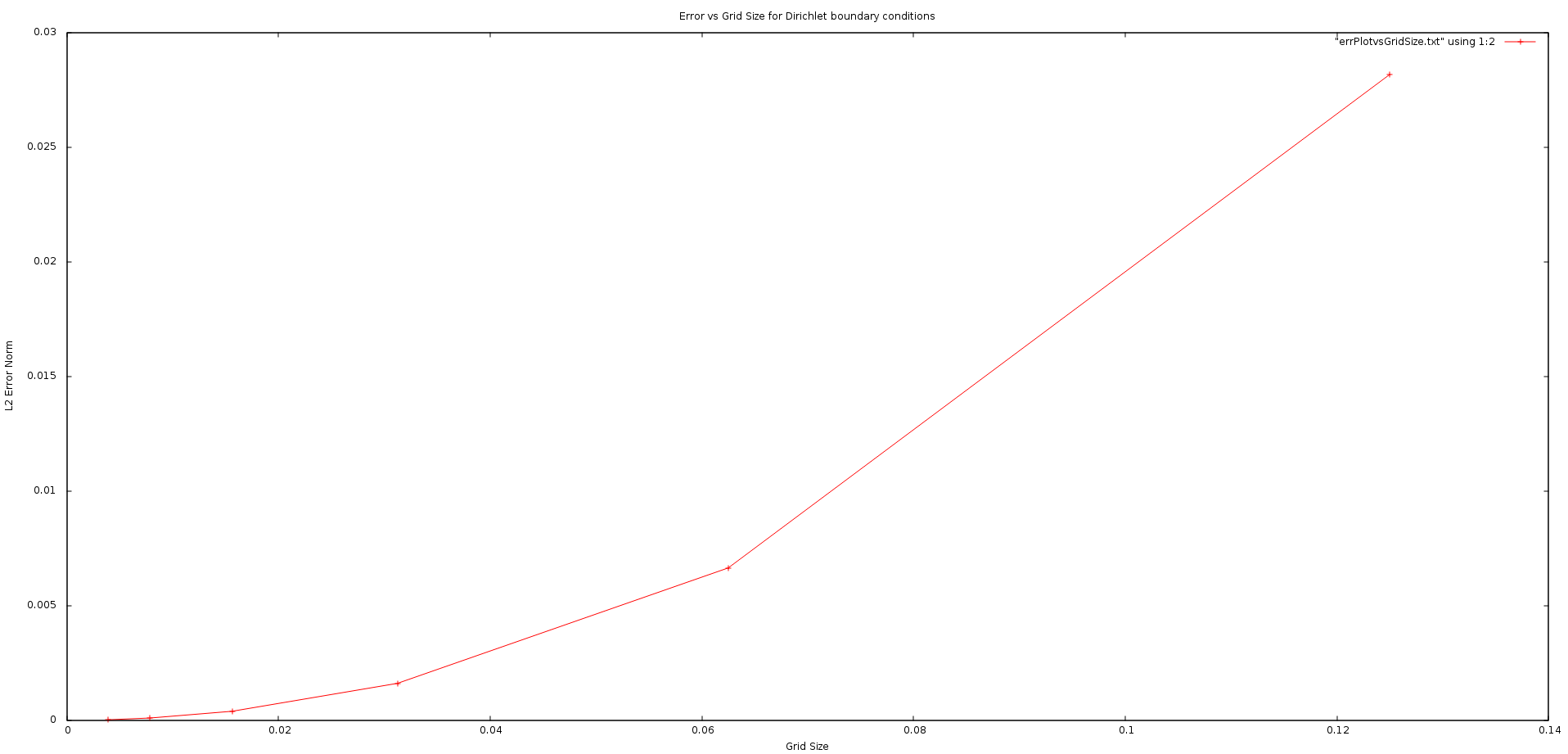
1) Dirichlet Boundary Conditions:

For this case, number of V-cycle = 15

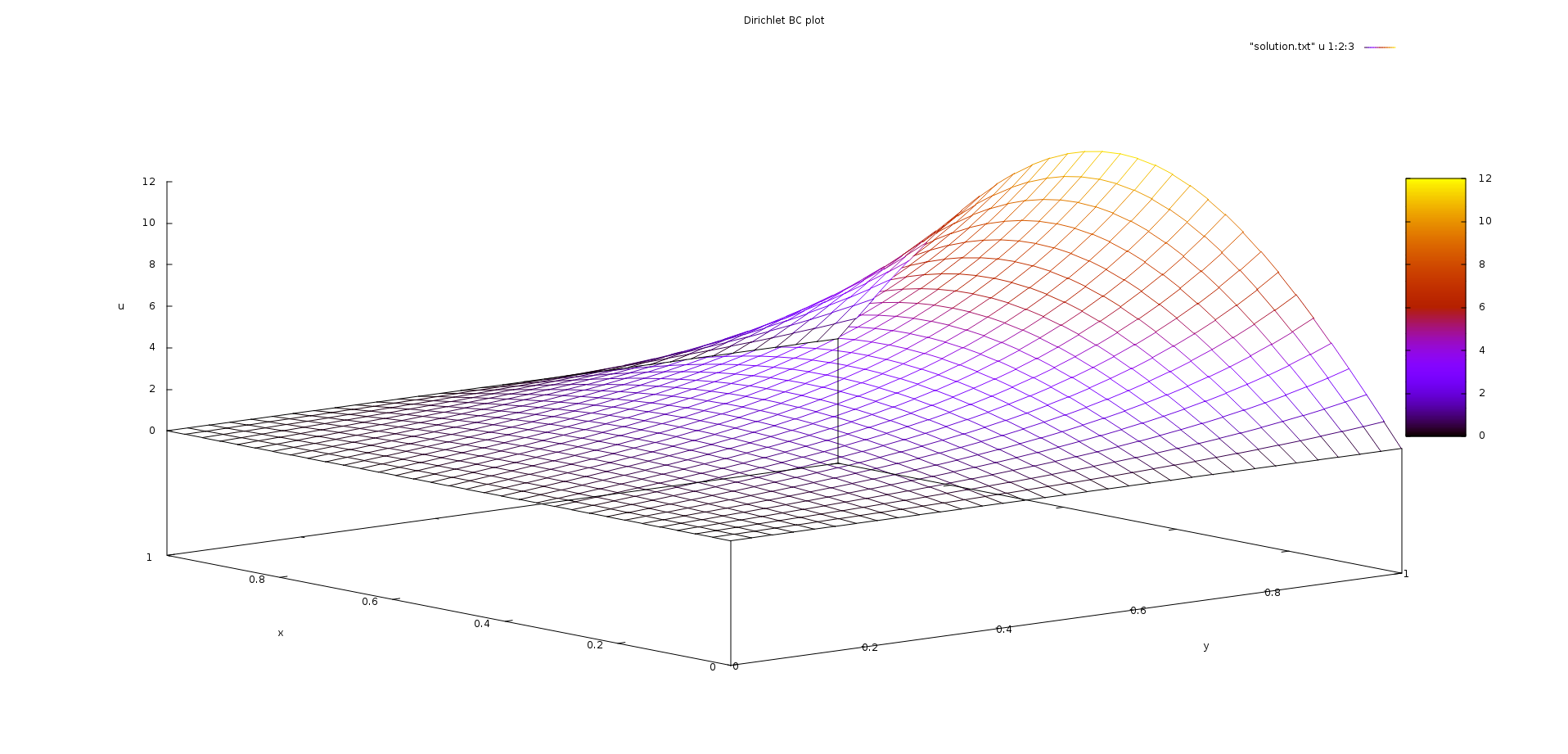
Following table contains error norm with varying grid size.

| S No | Grid Size (h) | Error Norm |
| --- | --- | --- |
| 1 | 0.125 | 0.0281737 |
| 2 | 0.0625 | 0.00664675 |
| 3 | 0.03125 | 0.00161231 |
| 4 | 0.015625 | 0.000396936 |
| 5 | 0.0078125 | 9.84684e-05 |
| 6 | 0.00390625 | 2.45215e-05 |

Following graph contains error norm with varying grid size.



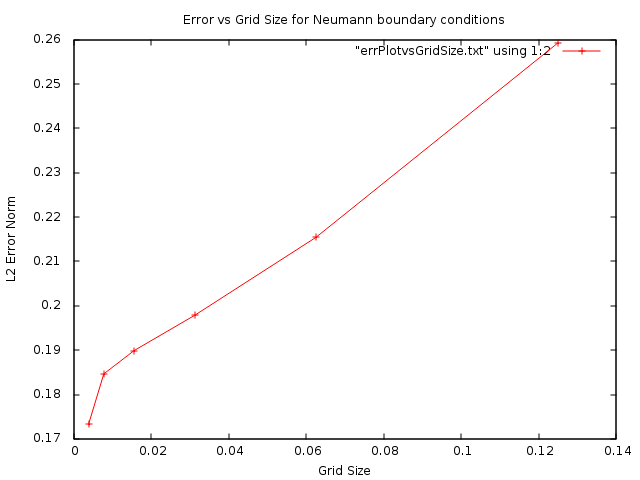
Computed solution for Dirichlet bc for level = 5, number of V-cycle =15.

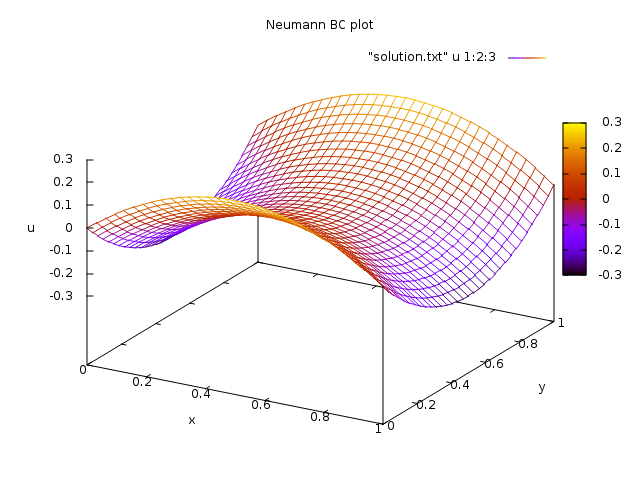


2) Neumann Boundary Conditions:

For this case, number of V-cycle = 50

| S No | Grid Size (h) | Error Norm |
| --- | --- | --- |
| 1 | 0.125 | 0.259294 |
| 2 | 0.0625 | 0.215424 |
| 3 | 0.03125 | 0.197853 |
| 4 | 0.015625 | 0.189904 |
| 5 | 0.0078125 | 0.184646 |
| 6 | 0.00390625 | 0.173314 |





Computed solution for Neumann bc for level = 5, number of V-cycle =50.