**ECE 6380 – Homework 9**

**Caitlyn Caggia**

1. See attached Matlab code.

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| **Mesh 1**  5 layers, 12 inner nodes  132 interior nodes | **Mesh 2**  10 layers, 30 inner nodes  530 interior nodes | **Mesh 3**  15 layers, 40 inner nodes  1120 interior nodes |
| 133 1.0108189290595 0  134 1.1044623122496 0  135 1.1044623122496 0  136 1.3302699985629 0  137 1.3334092348764 0  138 1.6129423126472 0  139 1.6129423126472 0  140 1.9051733629537 0  141 1.9082122591336 0 | 531 1.0212391320861 0  532 1.1100383691542 0  533 1.1101672573677 0  534 1.3301503224695 0  535 1.3306466028595 0  536 1.6081493050027 0  537 1.6081667717542 0  538 1.9012303128165 0 539 1.9016652541617 0 | 1121 1.0229242291988 0  1122 1.1109969719903 0  1123 1.1109969719905 0  1124 1.3299550226096 0  1125 1.3302141137078 0  1126 1.6072868333431 0  1127 1.6072868333434 0  1128 1.9003774374452 0  1129 1.9005931340652 0 |

1. Convergence rate is O(h2) as shown in the table and plot below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Number of Layers** | **Average Edge Length (h)** | **Error** | **h2** |
| 5 | 0.7187 | -0.3949022 | 0.51652969 |
| 10 | 0.3428 | -0.0920624 | 0.11751184 |
| 15 | 0.2323 | -0.046477 | 0.05396329 |

Where error is the average error over the first 4 eigenvalues.

1. The number of zero eigenvalues is equal to the number of nodes.
2. These results are less accurate than the results from problem set 8, but more accurate than the results in problem set 4.