Assignment\_4AP

**Case 1: Dirichlet Condition**

**Discretized Solution: Results**

K = 10; N = 10;

U = [ 0.3758 0.1374 0.0463 0.0115 -0.0018 -0.0068 -0.0086 -0.0090 -0.0084 -0.0061 ]

K = 10; N = 20;

U = [ 0.6057 0.3653 0.2188 0.1295 0.0750 0.0418 0.0216 0.0093 0.0018 -0.0028 -0.0056

-0.0072 -0.0082 -0.0087 -0.0089 -0.0088 -0.0084 -0.0076 -0.0062 -0.0039 ]

K=10; N=40;

U = [ 0.7771 0.6034 0.4680 0.3625 0.2803 0.2162 0.1663 0.1274 0.0971 0.0734 0.0550

0.0407 0.0295 0.0208 0.0140 0.0087 0.0046 0.0014 -0.0011 -0.0031 -0.0046 -0.0057

-0.0066 -0.0073 -0.0078 -0.0082 -0.0085 -0.0087 -0.0088 -0.0088 -0.0087 -0.0086 -0.0084

-0.0081 -0.0076 -0.0070 -0.0062 -0.0052 -0.0039 -0.0022 ]

K=100; N=40;

U = [ 0.1230 0.0150 0.0018 0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001

-0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001

-0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001

-0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 ]

**As you increase N, the distance of the nodes get smaller while the number of data points get larger resulting in a more accurate solution. Raising K value, speeds up the convergence of the curve as x approaches L = 1. This is also the case for Newmann boundary condition**

**Case 2: Neuman Condition**

**Discretized Solution: Results**

K = 10; N = 10;

U = [ -0.0994 -0.0442 -0.0230 -0.0150 -0.0119 -0.0106 -0.0101 -0.0095 -0.0086 -0.0062 ]

K = 10; N = 20;

U = [ -0.1070 -0.0691 -0.0461 -0.0320 -0.0234 -0.0182 -0.0150 -0.0130 -0.0118 -0.0111

-0.0106 -0.0103 -0.0101 -0.0098 -0.0096 -0.0092 -0.0087 -0.0078 -0.0063 -0.0039 ]

K = 10; N = 40;

U = [ -0.1092 -0.0873 -0.0703 -0.0570 -0.0466 -0.0385 -0.0322 -0.0273 -0.0235 -0.0205

-0.0182 -0.0164 -0.0150 -0.0139 -0.0130 -0.0123 -0.0118 -0.0114 -0.0111 -0.0108

-0.0106 -0.0104 -0.0103 -0.0102 -0.0101 -0.0100 -0.0098 -0.0097 -0.0096 -0.0094

-0.0092 -0.0090 -0.0087 -0.0083 -0.0078 -0.0071 -0.0063 -0.0053 -0.0039 -0.0022 ]

K = 100; N = 40;

U = [ -0.0063 -0.0009 -0.0002 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001

-0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001

-0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001

-0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 -0.0001 ]