Ryan Brosnahan

Computing Assignment 2

Part A:

%computing assignment 2A

w = 0.03;

M = 1;

L = 1.2;

N = 10;

EA = -0.3;

EB = -0.29;

x = (M+L)/2;

for n=1:2400

lambda = (n\*pi)/(w+N);

num = exp(lambda\*(x-(2\*L)))+exp(-lambda\*x);

num = num\*sin(lambda\*N)^2;

den = exp(lambda\*(M-(2\*L)))+exp(-lambda\*M);

den = den\*lambda^2;

frac = num/den;

fprintf('%d %e %e %e\n',n,num,den,frac)

end

n num den frac

2156 2.470328e-323 2.394929e-288 1.031483e-35

2157 1.976263e-323 1.752532e-288 1.127662e-35

2158 1.482197e-323 1.282445e-288 1.155758e-35

2159 9.881313e-324 9.384513e-289 1.052938e-35

2160 4.940656e-324 6.867275e-289 7.194494e-36

2161 4.940656e-324 5.025241e-289 9.831681e-36

2162 4.940656e-324 3.677301e-289 1.343555e-35

Part B:

%computing assignment 2B

w = 0.03;

M = 1;

L = 1.2;

N = 10;

EA = -0.3;

EB = -0.29;

x = (M+L)/2;

for n=1:2400

lambda = (n\*pi)/(w+N);

num = exp(lambda\*(x+M-(2\*L)))+exp(-lambda\*(x-M));

num = num\*sin(lambda\*N)^2;

den = exp(lambda\*((2\*M)-(2\*L)))+1;

den = den\*lambda^2;

frac = num/den;

fprintf('%d %e %e %e\n',n,num,den,frac)

end

n num den frac

2156 4.578043e-30 4.560321e+05 1.003886e-35

2157 4.450059e-30 4.564552e+05 9.749168e-36

2158 4.324870e-30 4.568785e+05 9.466126e-36

2159 4.202446e-30 4.573021e+05 9.189649e-36

2160 4.082753e-30 4.577258e+05 8.919648e-36

2161 3.965758e-30 4.581497e+05 8.656031e-36

2162 3.851426e-30 4.585738e+05 8.398705e-36

Part C:

%computing assignment 2C

w = 0.03;

M = 1;

L = 1.2;

N = 10;

EA = -0.3;

EB = -0.1;

x = 1;

for Nmax=100000:1000:150000

sum = 0;

for n=1:Nmax

lambda = (n\*pi)/(w+N);

num = exp(lambda\*(x+M-(2\*L)))+exp(-lambda\*(x-M));

num = num\*sin(lambda\*N)^2;

den = exp(lambda\*((2\*M)-(2\*L)))+1;

den = den\*lambda^2;

sum = sum + num/den;

end

E = 2\*(EB-EA)\*sum/w/(w+N) + (w\*EB+N\*EA)/(w+N);

fprintf('%d %20.14e\n',Nmax,E)

end

132000 -1.00051306749510e-01

133000 -1.00050920687701e-01

134000 -1.00050540452011e-01

135000 -1.00050165912726e-01

**136000 -1.00049796943768e-01 Looks like we have 0.1000… rounded**

137000 -1.00049433422564e-01

138000 -1.00049075229925e-01

139000 -1.00048722249925e-01

This guy converges very slowly!