# AMATH 403/503 Homework Assignment #6

Due: June 3, 2019

1. Green’s function of the 1-D heat equation in a semi-infinite domain, , is defined by:



subject to zero initial condition: 

The boundary condition is either (a):  or

(b): 

The solution in a semi-infinite domain can be constructed from the solution in the infinite domain by adding or subtracting another source located at , so that the contributions cancel at  for (a), or the contributions are symmetric about  Find the Green’s function defined above for boundary condition (a). Then repeat the problem for boundary condition (b).

2. Consider the following one-dimension nonhomogeneous wave equation (assume the boundary conditions are such that the solution is integrable):



subject to zero initial conditions: 

(a) Show that the above problem is the same as the following homogenous problem:



subject to the following “initial condition” at 



And 

(b) Solve the problem defined by (a), using Fourier transform or D’Alembert’s method.

(c) Use the result in (b) to solve:

PDE: 

BC: 

IC: 

You can leave your solution in (c) in integral form, but the integrand should be as simple as possible.