

Homework 7 (MATH 5400-01)**Name (Print):****Due date: Friday, Nov. 16, 2012**

1. The solution of the Sturm-Liouville boundary value problem was derived in class (Sect. 6.2). Consider the boundary conditions $y(0) - h_0 y'(0) = 0$, and $y(1) + h_1 y'(1) = 0$, where h_0 and h_1 are nonzero constants. Find the Green's function for this case.

Hint: you do only have to explain the modifications of the solution approach. Consider an appropriate modification of the boundary conditions for u and v .

2. The solution of the initial value problem

$$Ly = f(x), \quad y(0) = 0, \quad y'(0) = 0$$

is given by

$$y(x) = \int_0^x g(x,s) f(s) ds.$$

Show the validity of this solution and find the Green's function $g(x, s)$.

3. Find the resolvent kernel and solution of this problem:

$$y(x) = f(x) + \lambda \int_a^b e^{x-s} y(s) ds.$$

What is the required condition on λ ?