

HW 7
266A

1. For the operator and boundary conditions

$$Lu = u'' + \cos(x)u'$$

$$u(0) = u(1) = 0$$

find a weighted inner product

$$(u, v)_q = \int_0^1 \bar{u}v q dx$$

such that L is self-adjoint, i.e.

$$(u, Lv)_q = (Lu, v)_q$$

Hint: Look for $q = e^r$.

ans

2. If L is self-adjoint in a weighted inner product $(\cdot, \cdot)_q$ with $q > 0$, show that the eigenvalues are real and that the eigenfunctions (with distinct eigenvalues) are orthogonal.