MTH101: Tutorial 13

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Exercise 1.1

Show that $y'' + fy' + (g + \lambda h)y = 0$ *takes the form*

$$[p(x)y']' + [q(x) + \lambda r(x)]y = 0$$

if you set $p = exp(\int f dx)$, $q = pg$, $r = hp$.
Why would you do such a transformation?

Exercise 2.1

Find the eigenvalues and eigenfunctions of the following questions. Verify orthogonality.

1. $y'' + \lambda y = 0, \qquad y(0) = y(1), \quad y'(0) = y'(1).$
2. $y'' + \lambda y = 0, \qquad y(0) = 0, \quad y'(L) = 0.$