

國立臺灣海洋大學河海工程學系 2001 工程數學 (三) 第八次作業小考

1. Solve the eigenproblem $\mathcal{L}\{y_n\} = \lambda_n y_n$, subject to $y(0) = y(1) = 0$,

where $\mathcal{L} = \frac{d^2}{dx^2}$, λ_n and y_n are the eigenvalue and eigenfunction, respectively.

2. Express $G(x, s)$ in terms of the sum of eigenfunctions y_n .

3. By using the Green's function, solve $\mathcal{L}\{y\} = f(x)$. The solution can be expressed by

$$y(x) = \int_a^b G(x, s)f(s)ds,$$

where $f(s) = s$.