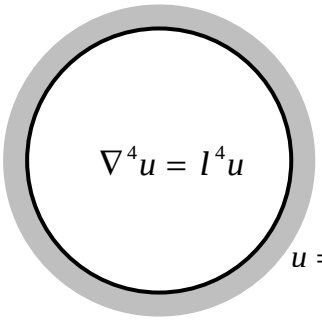
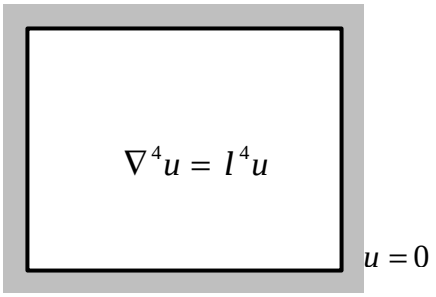
國立台灣海洋大學河海工程研究所–積分方程特論主題四

Meshless formulation for plate vibration





$$\nabla^4 u(x) = l^4 u(x), \quad x \in D$$
$$u(x) = 0, \quad x \in B$$

where $l^4 = \omega^2 \rho h / k$, $k = \dfrac{Eh^3}{12(1-\nu^2)}$

1. Circular case
   - Analytical study using circulants
   - SVD updating techniques
   - True and Spurious eigenvalues
   - Numerical experiment
2. Square case
   - Numerical experiment

$U(s,x) = \mathrm{Im}\{U_c(s,x)\}$, (1) $U_c(s,x) = -\dfrac{i}{8l^2}\{H_0^{(1)}(lr) - H_0^{(1)}(il r)\}$ (Kitahara)

3. (2) $U_c(s,x) = \mathrm{Re}\{-\dfrac{i}{8l^2}\{H_0^{(1)}(lr) - H_0^{(1)}(il r)\}\}$ (Hutchinson)

   (3) $U_c(s,x) = AJ_0(kr) + BI_0(kr)\}$ (Kang)

4. Meshless formulation
5. Determination of eigenvalues and eigenmodes
6. Exact solution:

$J_n(l)I_{n+1}(l) + I_n(l)J_{n+1}(l) = 0$, for clamped circular plate

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