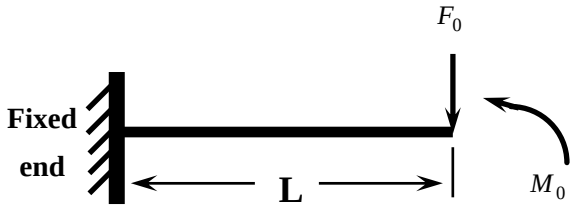
班級：_____學號：_____姓名：_____

國立台灣海洋大學河海工程研究所 BEM2004 第 8 次作業



Governing equation:

$$\frac{d^4u(x)}{dx^4} = 0,\ 0 < x < L$$

Boundary conditions:

$u(0) = 0,\ \theta(0) = 0$

$m(L) = M_0,\ v(L) = F_0$

Direct method

$$u(x) = \left\{-U(s,x)v(s) + \Theta(s,x)m(s) - M(s,x)\theta(s) + V(s,x)u(s)\right\}\Big|_{s=0}^{s=1}$$

Indirect method

Based on the indirect formulation, the displacement field can be represented by

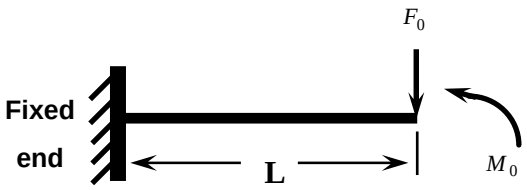
$$u(x) = \sum_{j=1}^{2} P(s_j, x)\phi_j + \sum_{j=1}^{2} Q(s_j, x)\psi_j \ .$$

The two kernels P and Q are obtained from either the two combinations of the kernels $U(s,x)$, $\Theta(s,x)$, $M(s,x)$ and $V(s,x)$.

Choosing P and Q	**Group**
U , Θ	吳安傑、錢榮芳、李文愷、周家慶
U , M	陳柏源、袁倫欽、莊士璿
U , V	高政宏、陳永為、黃家鴻
Θ , M	洪啟哲、王錦楨、吳尚津
Θ , V	張文夏、何易霖、張致文
M , V	楊秉璋、潘志鴻、陳柏帆

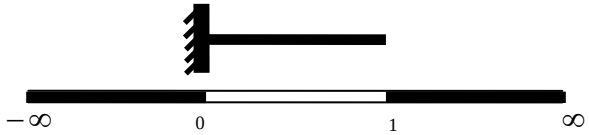
(1) Solve the exact solution of cantilever case subject to the end moment and shear.

(2) Solve the problem by the indirect BEM.



(3) Detect the rank of [A] matrix where

$$\begin{bmatrix} & A & \end{bmatrix}\begin{Bmatrix}\phi_1\\ \phi_2\\ \psi_1\\ \psi_2\end{Bmatrix} = \begin{Bmatrix}0\\ 0\\ F_0\\ M_0\end{Bmatrix}.$$



$$\begin{bmatrix} & A & \end{bmatrix}\begin{Bmatrix}\phi_1\\ \phi_2\\ \psi_1\\ \psi_2\end{Bmatrix} = \begin{Bmatrix}0\\ 0\\ F_0\\ M_0\end{Bmatrix}$$