

國立台灣海洋大學河海工程研究所積分方程式特論第六次作業

1. Given the linear algebraic system,

$$\begin{bmatrix} 1 & 0 \\ 0 & ae \end{bmatrix} \begin{Bmatrix} x_1 \\ x_2 \end{Bmatrix} = \begin{Bmatrix} 1 \\ be \end{Bmatrix}, \quad a, b, e \in R,$$

- ① Solve x_1 and x_2 analytically.
- ② Solve x_1 and x_2 numerically by setting $e \rightarrow 0$.
- ③ Solve x_1 and x_2 in the transformed system

$$[A + c\tilde{b}\tilde{b}^T] \tilde{x} = \tilde{b}$$

where c is an arbitrary constant.

④ Solve

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & ae + p & -p \\ 0 & -p & p \end{bmatrix} \begin{Bmatrix} x_1 \\ x_2 \\ x_3 \end{Bmatrix} = \begin{Bmatrix} 1 \\ be \\ 0 \end{Bmatrix},$$

where p is an arbitrary constant.

⑤ Solve x_1 and x_2 by using pseudo-inverse when $e \rightarrow 0$.