

邊界元素法1998 第十次作業

1. Solve the interior Laplace problem with exact solution

$$u(r, \theta) = r \cos(\theta)$$

by using BEPO2D program.

- (a). Boundary element mesh with 36 elements with Dirichelet boundary conditions.
- (b). Test $[\bar{T}]$ and $[M]$ matrices by use of simple solution.
- (c). Test $[U]^{-1}[\bar{T}]$ and $[\bar{L}]^{-1}[M]$ matrices by use of simple solution.
- (d). Test $[U]^{-1}[\bar{T}]$ and $[\bar{L}]^{-1}[M]$ matrices by use of equilibrium condition.
- (e). Plot the potential distribution for $0 < r < 1$.

2. Solve the exterior Laplace problem with exact solution

$$u(r, \theta) = \frac{1}{r} \cos(\theta)$$

by using BEPO2D program.

- (a). Boundary element mesh with 36 elements with Dirichelet boundary conditions.
- (b). Test $[\bar{T}]$ and $[M]$ matrices by use of simple solution.
- (c). Test $[U]^{-1}[\bar{T}]$ and $[\bar{L}]^{-1}[M]$ matrices by use of simple solution.
- (d). Test $[U]^{-1}[\bar{T}]$ and $[\bar{L}]^{-1}[M]$ matrices by use of equilibrium condition.
- (e). Plot the potential distribution for $1 < r < \infty$.

Method 1:

$$\begin{aligned} U_{ij} &\rightarrow U_{ij} \\ -\bar{T}_{ij} &\rightarrow \bar{T}_{ij}, (i \neq j) \\ \bar{T}_{ij} &\rightarrow \bar{T}_{ij}, (i = j) \\ -\bar{L}_{ij} &\rightarrow \bar{L}_{ij}, (i \neq j) \\ \bar{L}_{ij} &\rightarrow \bar{L}_{ij}, (i = j) \\ M_{ij} &\rightarrow M_{ij}, \end{aligned}$$