

Roles of hypersingularity in boundary element method

complementary constraints

higher order element

1. Hermite element

degenerate boundary

1. cutoff wall
2. sheet pile
3. crack
4. baffle
5. thin airfoil
6. antenna

$$(o) \begin{cases} [U](t)=[T](u) \\ [L](t)=[M](u) \end{cases}$$

$$(o) \begin{cases} [L](t)=[M](u) \\ [U](t)=[T](u) \end{cases}$$

$$(x) \begin{cases} [L](t)=[M](u) \\ [L](t)=[M](u) \end{cases}$$

$$(x) \begin{cases} [U](t)=[T](u) \\ [U](t)=[T](u) \end{cases}$$

corner problem

1. $\begin{cases} [U](t)=[T](u) \\ [L](t)=[M](u) \end{cases}$
2. $\begin{cases} [U](t)=[T](u) \\ [L](t)=[M](u) \end{cases}$
3. $\begin{cases} [L](t)=[M](u) \\ [L](t)=[M](u) \end{cases}$

fictitious eigenvalue

1. kernel function
2. region of singularity
3. boundary condition
4. Wronskian
5. Determinant
6. SVD

adaptive BEM

1. error estimator

secondary field calculation

1. hoop stress on boundary
2. tangent flux along boundary
3. regularized version for stress near boundary

Tikhonov regularization for inverse prob.

condition number

1. pseudo-differential operator
- | | |
|---------|--------|
| $U(-1)$ | $T(0)$ |
| $L(0)$ | $M(1)$ |
2. T, L is more stable than U, M

eigen problem using MRM

1. augmented eigenvalues
2. trivial mode

symmetry formulation

1. double boundary integration

free surface flow

image system

1. normal vector of dipole or dislocation

本研究

圖一:對偶積分方程第二式在邊界元素法所扮演的角色