邊界元素法 2003 專題研究

1. Extend the real dual BEM to complex dual BEM.
2. Solve the free vibration of a beam using MRM.
3. Solve the 3-D radiation modes for Helmholtz equation. (Reduce to Second order ODE for one variable, r)
4. Solve the 2-D axisymetric modes for Helmholtz equation. (Reduce to Second order ODE for one variable, r)
5. Solve the 2-D axisymetric modes for plate vibration. (Reduce to fourth order ODE for one variable, r)
6. Solve the Stokes flow using dual BEM.
7. Solve the Laplace equation with overspecified boundary conditions using dual BEM.
8. Solve the bending problem for a cracked beam.
9. Solve the dynamic problem for the tower of Golden Gate bridge subjected to support motions using dual series represenatation.
10. Solve the one-dimensional eigenproblem using dual BEM in the wave-number domain and explain the reasons why MRM has the problem of spurious eigenvalues and nonunique eigenmodes.
11. Extend Prob.**10** to two-dimensional problem using dual BEM in the wave-number domain and explain the reasons why MRM has the problem of spurious eigenvalues and nonunique eigenmodes.
12. Numerical experiments for irregular frequencies of exterior problems using SYSNOISE.
13. A regular formulation for the Helmholtz equation using the real part of kernel functions in dual equation.
14. A method for detecting the spurious roots in MRM using residual vetctor by dual formulation
15. A method for detecting the spurious roots in real-part BEM using residual vetctor by regular formulation of DBEM
16. Deriving the fundamental solution by using the Hadamard principal value in complex variable sense
17. Deriving the dual boundary integral equations for a three-dimensional potential problem with a corner
18. Deriving the dual boundary integral equations for two-dimensional Helmholtz problem with a corner
19. Solve the free-surface potential flow using dual BEM
20. Prediction of crack growth using dual BEM
21. Symmetry formulation for BEM using dual formulation
22. Vibration of membrane with stringers by using DBEM

23. Radiation problem with nonaxisymmetric boundary condition
24. Detection of spurious modes for MRM using SVD
25. Study on fictitious eigenvalues for semi-infinite domain
26. L-shape scattering problem
27. Vibration suppression for trench in half plane
28. Marine detection
29. Study on multiplicity
30. Analytical study for spurious solutions (MRM and real part) using circulants
31. Analytical study for spurious solutions (MRM and real part) using generalized coordinate
32. Regular BEM — Eigenanalysis using only imaginary part
33. Regular BEM — Eigenanalysis using plane waves
34. Eigenanalysis for annulus domain
35. CHEEF method for interior problem using only real-part instead of CHIEF for exterior problem
36. Least square and SVD
37. Impedance boundary condition
38. Half plane problem
39. Precondition technique and GSVD
40. Dynamic stiffness and dynamic flexibility using dual formulation (1-D rod and beam, 2-D circular cavity and 3-D sphere)
41. Adaptive BEM for nonuniform radiation
42. Numerical stability for regular (fictitious) BEM
43. Complete MRM
44. Water barrier subjected to oblique wave, $(\nabla^2 - k^2)u(x_1, x_2) = 0$
45. Derivation of the free terms using bump contour method
46. Degenerate scale problem in BEM using dual series model
47. Degenerate scale problem in BEM using auxilliary system $(ax + b)$
48. Application of wavelet on BEM
49. GSVD for spurious solution using UT formulation only
50. GSVD for spurious solution using LM formulation only
51. GSVD for fictitious solution using UT formulation only

52. GSVD for fictitious solution using LM formulation only

53. Spurious solutions using DRM

54. Calderon operator using circulants for harmonic and biharmonic fields

55. Spectral properties for plate ($U(s,x) = r^2 ln(r)$)

56. Detection of spurious solution for square cavity using determinat or σ_1 for $U^i, T^i, L^i,\ M^i$ and $U^e, T^e, L^e,\ M^e$.

57. Real part UT formulation plus two plane waves

58. Fictitious frequencies for annulus domain using complex kernels

59. Analytical derivation for plane waves with different incident directions

60. Ill-poseness for the fictitious boundary element method using spectral properties

61. The relations among the fictitious frequency, fictitious boundary mode, fictitious interior mode, radiation mode and radiation efficiency

62. Dual BEM for axisymmetric problem with baffle

63. BEM for problems with multiply-connected domain (Laplace and Helmholtz equation)

64. BEM for circular problems with mixed type boundary condition

65. Solving BEM using vortex singularity ($ln(r) + i\theta$)

66. Reduction to circulant for 3-D pherical problem

67. Adaptive BEM for problems with degenerate boundaries

68. UT formulation for problems with degenerate boundaries and the multi-domain condensation using SVD (invariant of the matrices)

69. SVD technique to determine the flexibility

70. On the fictitious frequency in the symmetric BEM for exterior acoustics

71. On the equivalence of Trefftz method and method of fundamental solution

72. On the fictitious frequency in the symmetric BEM for exterior acoustics

73. Derivation of the jump terms using degenerate kernels

74. Study of rigid body terms in BEM

75. BEM for half-plane problems

76. Degenerate scale problem in BEM using CHIEF concept.

77. Fast mutipole method applications in BEM

78. Study of the spurious solution using Fredholm alternative theorem

79. Study of the fictitious solution using Fredholm alternative theorem

80. Comparisons of Kupradze method (null field) and Olivera method (fictitious BEM or volume potential method)
81. BEM for problems with multiply-connected eigenproblems (Helmholtz equation) using Burton-Miller approach and CHIEF method.
82. Degenerate scale problem in BEM using CHIEF concept.
83. Meshless method using radial basis function (2-D cavity)
84. Meshless method using radial basis function (3-D cavity)
85. Meshless method using radial basis function (2-D plate)
86. Meshless method using radial basis function (2-D elasticity)
87. Meshless method using radial basis function (3-D elasticity)
88. Spurious eigenvalues in the triply-connected domain
89. Spurious eigenvalues and fictitious frequency for the elliptic domain (S. A. Yang)
90. Boundary eigensolution
91. A new method for Ricatti equation
91. Solution for multiply-connected problems subject to nonhomogeuous BC.
92. Elastic wave (fictitious frequency using circulants)
93. Electromagnetic wave (fictitious frequency using circulants)
94. Multiple scatters and radiators using SVD updating document (fictitious frequency)
95. Scaled boundary BEM (J. P. Wolf)
96. Spurious eigenvalues of annular plate (continuous system and discrete system)
97. SVD and Jordan form
98. Derivation of Poisson integral formulae
99. Degenerate scale for plate
100. Degenerate kernels for elasticity