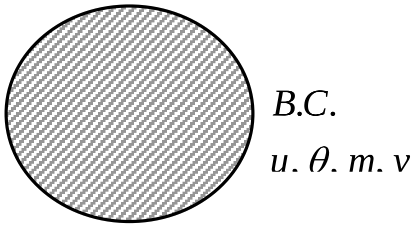
程式 33　Meshless method



Governing equation

$$\nabla^4 u(x) = \lambda u(x), \quad x \in D,$$

Boundary condition

Essential boundary condition

$$u(x) \ and \ \theta(x)$$

Natural boundary condition

$$m(x) \ and \ v(x)$$

where

$$\theta(x) = \frac{\partial u(x)}{\partial n}$$

$$m(x) = \nu \nabla^2 u(x) + (1-\nu)\frac{\partial^2 u(x)}{\partial n^2}$$

$$v(x) = \frac{\partial \nabla^2 u(x)}{\partial n} + (1-\nu)\frac{\partial}{\partial t}\frac{\partial^2 u(x)}{\partial n \partial t}$$

Boundary condition of plate vibration

	Clamped boundary	**Simply-supported boundary**	**Free boundary**
Boundary condition	$u(x)=0$ $\theta(x)=0$	$u(x)=0$ $m(x)=0$	$m(x)=0$ $v(x)=0$

1. Simply-connected problem by using imaginary-part and real-part fundamental solutions and multiply-connected problem by using the complex-valued fundamental solution
   (1) Clamped case　(2) Simply-supported case　(3) Free case
2. Treatment method
   (1) SVD updating technique　(2) B&M method (3) CHEEF method
   (4) Net approach (Kang and Lee)

References

1. Y. T. Lee, I. L. Chen, K. H. Chen and J. T. Chen, A new meshless method for free vibration analysis of plates using radial basis function, The 26th national conference on theoretical and applied mechanics, Taiwan, R.O.C., 2002.
2. J. T. Chen, I. L. Chen, K. H. Chen, Y. T. Lee and Y. T. Yeh, A meshless method for free vibration analysis of circular and rectangular clamped plates using radial basis function, Engineering Analysis with Boundary Elements, 2003, Accepted.
3. J. T. Chen, Y. T. Lee, I. L. Chen and K. H. Chen, Mathematical analysis and treatment for the true and spurious eigenequations of circular plate in the meshless method using radial basis function, 2003, Submitted

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