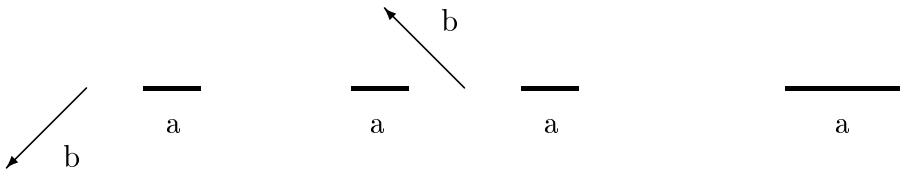
程式14-1 Membrane with stringers



(a)　(b)　(c)

1. Problem statement:
Governing equation:

$$(\nabla^2 + k^2)u(r,\theta) = 0, (r,\theta)\ in\ D$$

Boundary conditions:

$$u(r,\theta)\mid_{r=R} = sin(\theta/2), \text{for case (a)}$$

$$u(r,\theta)\mid_{r=R} = sin^2(\theta), \text{for case (b)}$$

$$u(r,\theta)\mid_{r=R} = sin^2(\theta), \text{for case (c)}$$

$$u(r,\theta) = 0\ (r,\theta)\ on\ the\ stringer$$

2. Output:
Convergence test for eigenvalue, eigenmode and stress intensity factor

$$\frac{a}{2b} = 0\ ,\ u(r,\theta) = \sum_{n=0}^{\infty} A_n J_n(kr)\cos n\theta$$

$$\frac{a}{2b} = \frac{1}{2}\ ,\ u(r,\theta) = \sum_{n=0}^{\infty} B_n J_{n+\frac{1}{2}}(kr)\sin(n+\frac{1}{2})\theta$$

$$\frac{a}{2b} = 1\ ,\ u(r,\theta) = \sum_{n=0}^{\infty} C_n J_n(kr)\sin n\theta$$

$$K_w = \frac{k\sqrt{\frac{R}{2\pi}}}{\sin(kR)}\int_0^{2\pi}\sin(\frac{\theta'}{2})u(R,\theta')d\theta'$$

References

[1] J. T. Chen, M. T. Liang, I. L. Chen, S. W. Chyuan and K. H. Chen, 1999, Dual boundary element analysis of wave scattering from singularities, Wave Motion, Vol.30, No.4, pp.367-381. (SCI and EI)