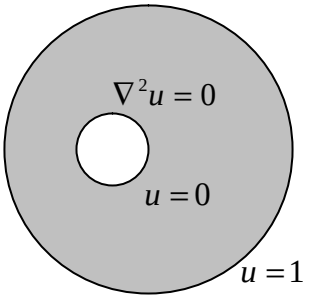
Beprog 94 偏心圓解析法

1. Conformal mapping： $\nabla^2 u = 0$ **[1]**

$$w = f(z) = \frac{z + \frac{1}{4}}{z + 4} \qquad \text{Where} \quad \begin{matrix} z = x + yi \\ w = u + vi \end{matrix}$$

$$u(r, f) = \frac{1}{2\ln 2} \ln\{\frac{16r^2 + 1 + 8r\cos f}{r^2 + 16 + 8r\cos f}\}$$

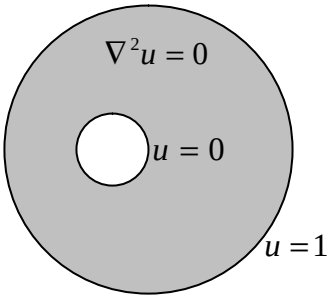


2. Bipolar coordinate [2]

$$x + yi = c \times \tanh(\frac{a + ib}{2})$$

where $\begin{matrix} z = x + yi \\ w = a + bi \end{matrix}$

$$z = c \tanh \frac{w}{2}$$



3. Null-field integral equation

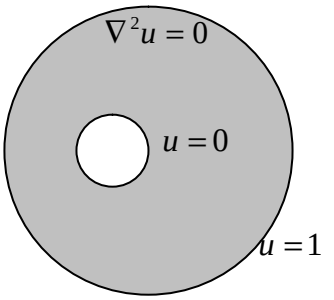
Fourier series

Degenerate kernel

$$O = \int_B T(s,x)u(s)dB(S) - \int_B U(s,x)t(s)dB(s)$$

$$t(s) = P_0 + \sum_{n=1}^{n} (P_n \cos nq + q_n \sin nq)$$

$$U(s,x) = \sum_{j=1}^{\infty} S_j(s) X_j(x)$$



4. Trefftz method [3]

5. Method of fundamental solution (MFS) [3]

References

1. G. F. Carrier and C.E. Pearson, Partial Differential Equations-Theory and Technique, Academic Press, New York, 1976.
2. N. N. Lebedev, I. P. Skalskaya, Y. S. Uflyand, Worked Problems in Appled Mathematics, Dover, 1979.
3. C.S. Wu, Degenerate scale analysis for membrane and plate problems using the meshless method and boundary element method, Master thesis, Department of Harbor and River Eagineery, Taiwan Ocean University, Keelung, 2004.