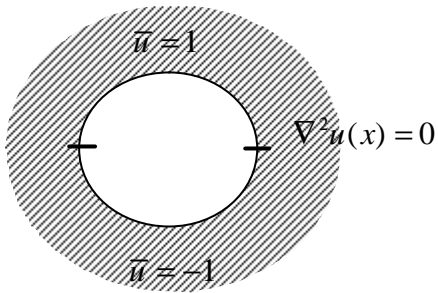


程式 81 Exterior Laplace problem



1. Exact solution  $u(x, y) = \frac{2}{p} \tan^{-1}\left(\frac{2y}{x^2 + y^2 - 1}\right)$
2. Poisson integral formula  $u(\mathbf{r}, \mathbf{f}) = \frac{1}{2p} \int_0^{2p} \frac{\mathbf{r}^2 - a^2}{a^2 - \mathbf{r}^2 - 2a\mathbf{r} \cos(\mathbf{f} - \mathbf{q})} f(\mathbf{q}) d\mathbf{q}$
3. Series solution using the null-field integral equation, Fourier series and degenerate kernels.

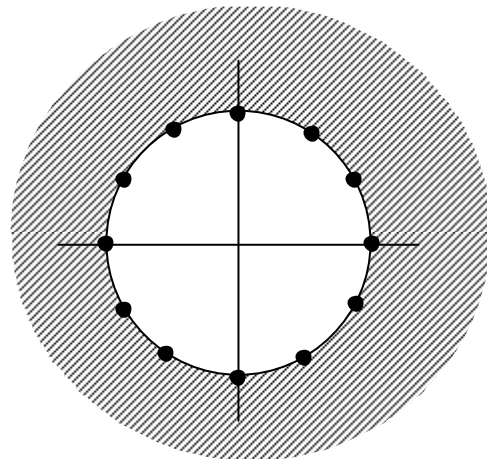
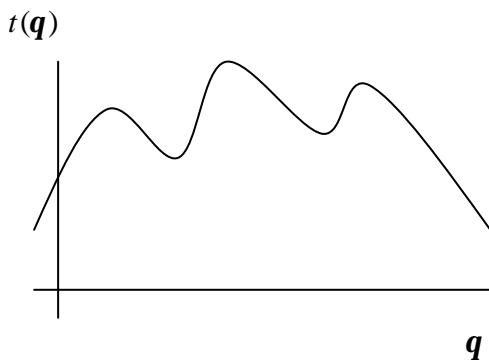
$$\bar{u}(\mathbf{q}) = \sum_1^{\infty} (a_n \cos n\mathbf{q} + b_n \sin n\mathbf{q}) \text{ where } a_n \text{ and } b_n \text{ can be determined from B.C.}$$

$$\bar{u}(\mathbf{q}) = \begin{cases} 1 & , 0 < \mathbf{q} < p \\ -1 & , p < \mathbf{q} < 2p \end{cases} , \quad t(\mathbf{q}) = \sum_1^{\infty} (p_n \cos n\mathbf{q} + q_n \sin n\mathbf{q})$$

$$u(\mathbf{r}, \mathbf{f}) = ?$$

4. BEM (BEPO2D program)

示意圖



Contour plot of potential?

5. MFS (Dr. K. H. Chen)