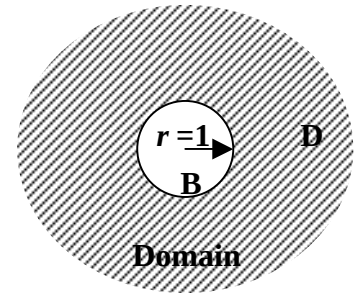


國立台灣海洋大學河海工程研究所無網格法第三次作業

Trefftz method :

$$\nabla^2 u(x) = 0, \quad x \in D$$

$$u(x) = \cos(3\theta), \quad x \in B$$



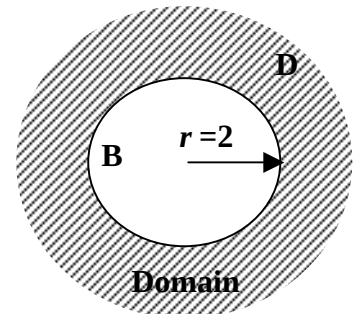
(a) By choosing T-complete set, $\ln r$, $\frac{1}{r} \cos \theta$, $\frac{1}{r} \sin \theta$, $\frac{1}{r^2} \cos 2\theta$, $\frac{1}{r^2} \sin 2\theta$, find the Trefftz solution using the point collocation approach.

(b) By choosing T-complete set, $\ln r$, $\frac{1}{r} \cos \theta$, $\frac{1}{r} \sin \theta$, $\frac{1}{r^2} \cos 2\theta$, $\frac{1}{r^2} \sin 2\theta$,

$\frac{1}{r^3} \cos 3\theta$, $\frac{1}{r^3} \sin 3\theta$, $\frac{1}{r^4} \cos 4\theta$, $\frac{1}{r^4} \sin 4\theta$, find the Trefftz solution using the point collocation approach.

※ Extend the HW2 to exterior problem (Two cases : $r=1$ and $r=2$)

$$u(x) = \ln 2 + \frac{1}{8} \cos(3\theta), \quad x \in B$$



Ans : Exact solution : $u(r, \theta) = \ln r + \frac{1}{r^3} \cos 3\theta$