

邊界元素法第五次作業

1. Given $U(x, y) = \ln\sqrt{(x^2 + y^2)}$, and polar coordinates

$$x = r \cos(\theta), \quad y = r \sin(\theta), \quad dA = r dr d\theta$$

- (1). Find \mathbf{F} where $\mathbf{F} = \nabla U$. (5%)
- (2). Find $\int \mathbf{F} \cdot \mathbf{n} \, ds$ along boundary contour ds of unit circle. (5%) (note that \mathbf{n} is the normal vector on the boundary contour of unit circle).
- (3). Find $\int \nabla \cdot \mathbf{F} \, dA$ on area of unit circle. (5%)
- (4). Divergence theorem tells us that $\int \nabla \cdot \mathbf{F} \, dA = \int \mathbf{F} \cdot \mathbf{n} \, ds$. Are the results of (2) and (3) the same ? Why ! (5%)

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【存檔：E:/ctex/course/bem/hw975.te】 【建檔:Mar./15/'97】