

國立台灣海洋大學河海工程研究所 BEM 2006 第 07 次作業

1. In the course, we derive the Poisson integral formula for the interior domain.
Please extend to exterior case.
2. Using the Poisson formula, determine the following integrals

$$\oint \frac{1}{(1-2p \cos(\mathbf{q}) + p^2)} d\mathbf{q}, |p| > 1$$

$$\oint \frac{\cos(2\mathbf{q})}{(1-2p \cos(\mathbf{q}) + p^2)} d\mathbf{q}, |p| > 1$$

$$\oint \frac{1-p \cos(\mathbf{q})}{(1-2p \cos(\mathbf{q}) + p^2)} d\mathbf{q}, |p| > 1$$

$$\oint \frac{\sin(\mathbf{q})}{(1-2p \cos(\mathbf{q}) + p^2)} d\mathbf{q}, |p| > 1$$

$$\oint \ln \sqrt{(1-2p \cos(\mathbf{q}) + p^2)} d\mathbf{q}, |p| > 1$$

Comments:

1. Residue theorem.
2. Series of degenerate kernel
3. Poisson integral formula