Derivation of Poisson kernel

$$x = (r, f), \quad s = (R, q)$$

$$2pu(s) = \int_B T_p(x,s)u(x)dB(x) - \int_B U_p(x,s)t(x)\,dB(x)$$ ←***域內內點的邊界基分方程***

若 $r = a$ ***時***, $\quad U_p(x,s) = 0$

$$2p\,u(s) = \int_B T_p(x,s)u(x)dB(x)$$

$$= \int_0^{2p} T_p(r, f; R, q; \frac{a^2}{R}, q)\, f(f)\, a\, df$$

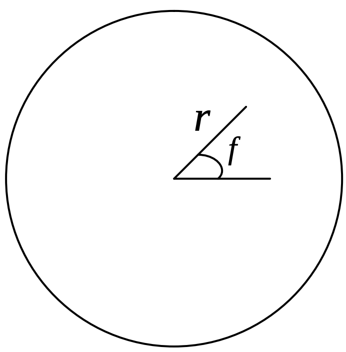
$r = a$ 代入

$$u(R,q) = \frac{1}{2p}\int_0^{2p} T_p(R, f; R, q; \frac{a^2}{R}, q)\, f(f)\, a\, df$$

$$= \frac{1}{2p}\int_0^{2p} \frac{a^2 - R^2}{a[a^2 + R^2 - 2aR\cos(f - q)]} f(f) a df$$

$$= \frac{1}{2p}\int_0^{2p} \frac{a^2 - R^2}{a^2 + R^2 - 2aR\cos(f - q)} f(f) df$$

$$u(r, f) = \frac{1}{2p}\int_0^{2p} \frac{a^2 - r^2}{a^2 + r^2 - 2ar\cos(f - q)} f(q) dq$$



$f(q) = u(1, q)$

佳聰製表(poissonf.doc)