程式 77　Free term for plate problem (static problem)

In the 2-D smooth boundary case, we have the successful experiences of boundary integral formulations for Laplace operator as follows:

$$2\pi u(x) = \int T(s,x)u(s)dB(s) - \int U(s,x)t(s)\,dB(s), \quad x \in D$$

$$2\pi t(x) = \int M(s,x)u(s)dB(s) - \int L(s,x)t(s)\,dB(s) \quad x \in D$$

$$\Downarrow$$

$$\pi u(x) = C.P.V. \int T(s,x)u(s)dB(s) - R.P.V. \int U(s,x)t(s)\,dB(s), \quad x \in B$$

$$\pi t(x) = H.P.V. \int M(s,x)u(s)dB(s) - C.P.V. \int L(s,x)t(s)\,dB(s) \quad x \in B$$

Now, we will extend it to the biharmonic operator and derive the BIEs for smooth boundary points,

$$a u(x) = -F.P. \int_B U\ (s,x)v(s)dB(s) + F.P. \int_B \Theta\ (s,x)m(s)dB(s) - F.P. \int_B M\ (s,x)q(s)dB(s) + F.P. \int_B V\ (s,x)u(s)dB(s)$$

$$b q(x) = -F.P. \int_B U_q(s,x)v(s)dB(s) + F.P. \int_B \Theta_q(s,x)m(s)dB(s) - F.P. \int_B M_q(s,x)q(s)dB(s) + F.P. \int_B V_q(s,x)u(s)dB(s)$$

$$c m(x) = -F.P. \int_B U_m(s,x)v(s)dB(s) + F.P. \int_B \Theta_m(s,x)m(s)dB(s) - F.P. \int_B M_m(s,x)q(s)dB(s) + F.P. \int_B V_m(s,x)u(s)dB(s)$$

$$d v(x) = -F.P. \int_B U_v(s,x)v(s)dB(s) + F.P. \int_B \Theta_v(s,x)m(s)dB(s) - F.P. \int_B M_v(s,x)q(s)dB(s) + F.P. \int_B V_v(s,x)u(s)dB(s)$$

where $U(s,x) = \frac{1}{8\pi} r^2 \ln r$, $F.P.$ denotes the finite parts. Please find *a, b, c, d* and the finite parts.

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