邊界元素法1999 第七次作業

1. In the course, we intoduced a small term $qu(x)$ into

$$\frac{d^2u(x)}{dx^2} = \delta(x-s), \; -\infty < x < \infty \tag{1}$$

we can obtain

$$\frac{d^2u(x)}{dx^2} - qu(x) = \delta(x-s), \; -\infty < x < \infty \tag{2}$$

We have solved the fundamental solution for Eq.(1) by the limiting process of the results in Eq.(2). For the homework, what happens if $-qu(x)\,i$ is added into the system.

2. In the same way, by intoducing a small term $pu(x)$ into

$$\frac{d^4u(x)}{dx^4} = \delta(x-s), \; -\infty < x < \infty \tag{3}$$

we have

$$\frac{d^4u(x)}{dx^4} + pu(x) = \delta(x-s), \; -\infty < x < \infty \tag{4}$$

Solve the fundamental solution for Eq.(3) by the limiting process of the results in Eq.(4).

3. Summary: methods for solving fundamental solution

(1). subsection method

(2). Variations of parameters — Wronskian

(3). Limiting process for Dirac-Delta function: normal distribution

(4). transform methods by introducing a small term(single pole of residue)

(5). transform methods directly (higher pole of rsidue) — extended residue theorem.