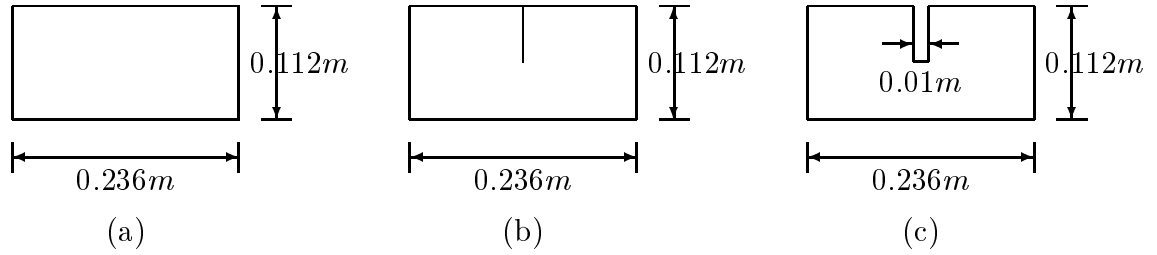


程式5 BESTOKES



1. Governing equations:

$$\nabla \cdot \boldsymbol{\sigma} = -\nabla \mathbf{p} + \mu \nabla^2 \mathbf{u} = \mathbf{0}$$

$$\nabla \cdot \mathbf{u} = 0$$

2. Dual boundary integral equations:

$$4\pi\mu\mathbf{u}(x) = \int_B T(\mathbf{s}, \mathbf{x})\mathbf{u}(\mathbf{s})dB(\mathbf{s}) - \int U(\mathbf{s}, \mathbf{x})\mathbf{t}(\mathbf{s})dB(\mathbf{s})$$

$$4\pi\mu\mathbf{t}(x) = \int_B M(\mathbf{s}, \mathbf{x})\mathbf{u}(\mathbf{s})dB(\mathbf{s}) - \int L(\mathbf{s}, \mathbf{x})\mathbf{t}(\mathbf{s})dB(\mathbf{s})$$

3. The four kernels:

$$U_{ik}(\mathbf{s}, \mathbf{x}) = \frac{\delta_{ik}}{r} + \frac{y_i y_k}{r^3}$$

$$T_{ik}(\mathbf{s}, \mathbf{x}) = \frac{-6 y_i y_j y_k n_j}{r^5}$$

$$L_{ik}(\mathbf{s}, \mathbf{x}) = \mathcal{T}(U_{ik}(\mathbf{s}, \mathbf{x})) \quad y_i = x_i - s_i, \quad r = |\mathbf{x} - \mathbf{s}|$$

$$M_{ik}(\mathbf{s}, \mathbf{x}) = \mathcal{T}(T_{ik}(\mathbf{s}, \mathbf{x}))$$

4. The closed-form formula for the four kernels:

$$\int U_{ik}(\mathbf{s}, \mathbf{x})dB(\mathbf{s}) = ?$$

$$\int T_{ik}(\mathbf{s}, \mathbf{x})dB(\mathbf{s}) = ?$$

$$\int L_{ik}(\mathbf{s}, \mathbf{x})dB(\mathbf{s}) = ?$$

$$\int M_{ik}(\mathbf{s}, \mathbf{x})dB(\mathbf{s}) = ?$$