

$$\begin{aligned}\{\mathbf{F}_{mn}^{(p)}(h_p)\} &= \prod_{k=p}^1 [\mathbf{D}_{mn}^{(k)}(h_k)] \{\mathbf{F}_{mn}^{(1)}(0)\} \\ &= [\mathbf{D}_{mn}] \{\mathbf{F}_{mn}^{(1)}(0)\}\end{aligned}\quad (4.49a)$$

where, for the k th material layer

$$[\mathbf{D}_{mn}^{(k)}(h_k)] = \exp([\mathbf{G}_{mn}^{(k)}]h_k) \quad (4.49b)$$

$$[\mathbf{G}_{mn}^{(k)}] = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ C_2\zeta^2 + C_6\eta^2 & (C_3 + C_6)\zeta\eta & C_1\zeta \\ (C_3 + C_6)\zeta\eta & C_6\zeta^2 + C_4\eta^2 & C_5\eta \\ -C_1\zeta & -C_5\eta & C_7 \\ C_8 & 0 & -\zeta \\ 0 & C_9 & -\eta \\ \zeta & \eta & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}^{(k)} \quad (4.49c)$$

and

$$\{\mathbf{F}_{mn}(z)\} = [U_{mn}(z) \quad V_{mn}(z) \quad Z_{mn}(z) \quad X_{mn}(z) \quad Y_{mn}(z) \quad W_{mn}(z)]^T$$

$$\{\mathbf{F}_{mn}^{(p)}(h_p)\}^T = [U_{mn}(h) \quad V_{mn}(h) \quad 0 \quad 0 \quad 0 \quad W_{mn}(h)]$$

and (4.50)

$$\{\mathbf{F}_{mn}^{(1)}(0)\} = \left\{ \begin{array}{l} U_{mn}(0) \\ V_{mn}(0) \\ \frac{4p_z}{ab} \sin\left(\frac{m\pi x_0}{a}\right) \sin\left(\frac{n\pi y_0}{b}\right) \\ \quad + \frac{4}{ab} \int_0^a \int_0^b q(x, y) \sin\left(\frac{m\pi x}{a}\right) \sin\left(\frac{n\pi y}{b}\right) dx dy \\ \frac{4p_x}{ab} \cos\left(\frac{m\pi x_0}{a}\right) \sin\left(\frac{n\pi y_0}{b}\right) \\ \frac{4p_y}{ab} \sin\left(\frac{m\pi x_0}{a}\right) \cos\left(\frac{n\pi y_0}{b}\right) \\ W_{mn}(0) \end{array} \right\}$$