

$$q_t + \sum_{i=1}^3 \frac{\partial F_i}{\partial x_i} = f$$

$$q_t + \frac{\partial F_1}{\partial x} + \frac{\partial F_2}{\partial y} - f = 0$$

$$q_t + \frac{\partial F_1}{\partial x} + \frac{\partial F_2}{\partial y} + \sigma_1 q + \sigma_2 q + \sigma_3 q - f = 0$$

$$\int_{K_i} \left(q_t + \frac{\partial F_1}{\partial x} + \frac{\partial F_2}{\partial y} + \sigma_1 q + \sigma_2 q + \sigma_3 q - f \right) l \, dx = 0$$

$$\int_{K_i} (q_t - f) l \, dV - \int_{K_i} \left(\frac{\partial F_1}{\partial x} + \frac{\partial F_2}{\partial y} \right) l \, dV + \int_{K_i} (\sigma_1 q + \sigma_2 q + \sigma_3 q) l \, dV = 0$$

$$\int_{K_i} (q_t - f) l \, dV - \int_{K_i} (F_1 + F_2) l \, dV + \int_{K_i} (\sigma_1 q + \sigma_2 q + \sigma_3 q) l \, dV = - \int_{\partial K_i} (n_1 F_1 + n_2 F_2) l \, dS$$