$$\mathbf{K}_e = \mathbf{B}_e^{\mathrm{T}} \mathbf{D} \mathbf{B}_e A_e t$$

$$\mathbf{D} = \frac{E}{1-\nu^2} \begin{bmatrix} 1 & \nu & 0 \\ \nu & 1 & 0 \\ 0 & 0 & \dfrac{1-\nu}{2} \end{bmatrix}$$

$$\mathbf{B}_e = \frac{1}{2A_e} \begin{bmatrix} y_{e23} & 0 & y_{e31} & 0 & y_{e12} & 0 \\ 0 & x_{e32} & 0 & x_{e13} & 0 & x_{e21} \\ x_{e32} & y_{e23} & x_{e13} & y_{e31} & x_{e21} & y_{e12} \end{bmatrix}$$

$$A_e = \frac{1}{2} \begin{vmatrix} 1 & x_1 & y_1 \\ 1 & x_2 & y_2 \\ 1 & x_3 & y_3 \end{vmatrix}$$

$$\begin{bmatrix} \boldsymbol{f}_{\mathrm{f}} \\ \boldsymbol{f}_{\mathrm{d}} \end{bmatrix} = \begin{bmatrix} \mathbf{K}_{\mathrm{ff}} & \mathbf{K}_{\mathrm{fd}} \\ \mathbf{K}_{\mathrm{df}} & \mathbf{K}_{\mathrm{dd}} \end{bmatrix} \begin{bmatrix} \boldsymbol{u}_{\mathrm{f}} \\ \boldsymbol{u}_{\mathrm{d}} \end{bmatrix}$$

$$\mathbf{K}_{\mathrm{ff}} \boldsymbol{u}_{\mathrm{f}} = \boldsymbol{f}_{\mathrm{f}} - \mathbf{K}_{\mathrm{fd}} \boldsymbol{u}_{\mathrm{d}}$$

$$\boldsymbol{f}_{\mathrm{d}} = \mathbf{K}_{\mathrm{df}} \boldsymbol{u}_{\mathrm{f}} + \mathbf{K}_{\mathrm{dd}} \boldsymbol{u}_{\mathrm{d}}$$