$$\vec{v} = N_1(\vec{p}) \cdot \vec{v_1} + N_2(\vec{p}) \cdot \vec{v_2} + N_3(\vec{p}) \cdot \vec{v_3} \tag{1}$$

$$\vec{v} = N_1(\vec{p}) \cdot \vec{v_1} + N_2(\vec{p}) \cdot \vec{v_2} + N_3(\vec{p}) \cdot \vec{v_3} + N_4(\vec{p}) \cdot \vec{v_4} \tag{2}$$

$$\vec{P_1} \rightarrow \begin{bmatrix} 0 \\ 0 \end{bmatrix} \quad \vec{P_2} \rightarrow \begin{bmatrix} 1 \\ 0 \end{bmatrix} \quad \vec{P_3} \rightarrow \begin{bmatrix} 0 \\ 1 \end{bmatrix} \tag{3}$$

$$\begin{aligned} \xi(x,y) &= \frac{x(y_3 - y_1) + y(x_1 - x_3) + y_1 x_3 - y_3 x_1}{(x_2 - x_1)(y_3 - y_1) + (y_1 - y_2)(x_3 - x_1)} \\ \eta(x,y) &= \frac{x(y_1 - y_2) + y(x_2 - x_1) + y_2 x_1 - y_1 x_2}{(x_2 - x_1)(y_3 - y_1) + (y_1 - y_2)(x_3 - x_1)} \end{aligned} \tag{4}$$

$$\begin{aligned} N_1(\xi,\eta) &= 1 - \xi - \eta \\ N_2(\xi,\eta) &= \xi \\ N_3(\xi,\eta) &= \eta \end{aligned} \tag{5}$$

$$\begin{aligned} \vec{v} &= N_1(\xi,\eta) \cdot \vec{v_1} + N_2(\xi,\eta) \cdot \vec{v_2} + N_3(\xi,\eta) \cdot \vec{v_3} \\ &= (1 - \xi - \eta) \cdot \vec{v_1} + \xi\vec{v_2} + \eta\vec{v_3} \end{aligned} \tag{6}$$

$$\begin{aligned} x &= a_1 + a_2\xi + a_3\eta + a_4\xi\eta \\ y &= b_1 + b_2\xi + b_3\eta + b_4\xi\eta \end{aligned} \tag{7}$$

$$\begin{aligned} N_1 &= \frac{(1-\eta)(1-\xi)}{4} \\ N_2 &= \frac{(1+\eta)(1-\xi)}{4} \\ N_3 &= \frac{(1+\eta)(1+\xi)}{4} \\ N_4 &= \frac{(1-\eta)(1+\xi)}{4} \end{aligned} \tag{8}$$

$$\vec{P} = \frac{1}{4}(\vec{P_1}+\vec{P_2}+\vec{P_3}+\vec{P_4})+\frac{\xi}{4}(\vec{P_2}-\vec{P_1}+\vec{P_3}-\vec{P_4})+\frac{\eta}{4}(\vec{P_3}-\vec{P_2}+\vec{P_4}-\vec{P_1})+\frac{\xi\eta}{4}(\vec{P_1}-\vec{P_2}+\vec{P_3}-\vec{P_4}) \tag{9}$$

$$\vec{v} = \frac{(1-\eta)(1-\xi)}{4}\cdot\vec{v_1}+\frac{(1+\eta)(1-\xi)}{4}\cdot\vec{v_2}+\frac{(1+\eta)(1+\xi)}{4}\cdot\vec{v_3}+\frac{(1-\eta)(1+\xi)}{4}\cdot\vec{v_4} \tag{10}$$

$$\vec{P} = (1-\alpha)\vec{P_1} + \alpha\vec{P_2} \qquad \alpha \in [0,1] \tag{11}$$

$$\begin{bmatrix} x_1 & y_1 & z_1 \\ x_2 & y_2 & z_2 \\ \vdots & \vdots & \vdots \\ x_n & y_n & z_n \end{bmatrix} \tag{12}$$

$$\begin{bmatrix} n_{11} & \cdots & n_{1N} \\ \vdots & \ddots & \vdots \\ n_{M1} & \cdots & n_{MN} \end{bmatrix} \tag{13}$$

$$\begin{bmatrix} n'_1 & \vec{e}_1 \\ \vdots & \vdots \\ n'_{MN} & \vec{e}_{MN} \end{bmatrix} \qquad \vec{e}_i \in \mathbb{R}^k,\ 1 \le i \le MN,\ k \in \mathbb{N} \tag{14}$$