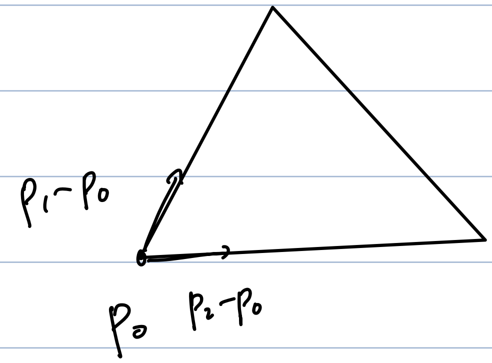

$$(1,0) \to q_1$$

$$(0,1) \to q_2$$

$$(u,v) = (x_0, y_0) + s(x_1 - x_0,\ y_1 - y_0) + t(x_2 - x_0,\ y_2 - y_0)$$

$$u = x_0 + s(x_1 - x_0) + t(x_2 - x_0)$$

$$v = y_0 + s(y_1 - y_0) + t(y_2 - y_0)$$

$$-\begin{cases} u(y_1 - y_0) = x_0(y_1 - y_0) + s(y_1 - y_0)(x_1 - x_0) + t(y_1 - y_0)(x_2 - x_0) \\ v(x_1 - x_0) = y_0(x_1 - x_0) + s(y_1 - y_0)(x_1 - x_0) + t(y_2 - y_0)(x_1 - x_0) \end{cases}$$

$$u(y_1 - y_0) - v(x_1 - x_0) = x_0 y_1 - y_0 x_1 + (y_1 x_2 - y_0 x_2 - y_1 x_0 - y_2 x_1 + y_0 x_1 + y_2 x_0)\, t$$

$$t = \frac{u(y_1 - y_0) - v(x_1 - x_0) - x_0 y_1 + y_0 x_1}{y_1 x_2 - y_0 x_2 - y_1 x_0 - y_2 x_1 + y_0 x_1 + y_2 x_0}$$

$$-\begin{cases} u(y_2 - y_0) = x_0(y_2 - y_0) + s(y_2 - y_0)(x_1 - x_0) + t \sim \\ v(x_2 - x_0) = y_0(x_2 - x_0) + s(y_1 - y_0)(x_2 - x_0) + t \sim \end{cases}$$

$$u(y_2 - y_0) - v(x_2 - x_0) = x_0 y_2 - y_0 x_2 + (y_2 x_1 - y_0 x_1 - y_2 x_0 - y_1 x_2 + y_0 x_2 + y_1 x_0)\, s$$

$$s = \frac{u(y_2 - y_0) - v(x_2 - x_0) - x_0 y_2 + y_0 x_2}{y_2 x_1 - y_0 x_1 - y_2 x_0 - y_1 x_2 + y_0 x_2 + y_1 x_0}$$

5. (a) $q_0 = (u_0, v_0) \quad q_1 = (u_1, v_1) \quad q_2 = (u_2, v_2)$

$$(u-u_0,\ v-v_0) = (\,s(u_1-u_0)+t(u_2-u_0),$$

$$\begin{bmatrix} u-u_0 \\ v-v_0 \end{bmatrix} = \underbrace{\begin{bmatrix} u_1-u_0 & u_2-u_0 \\ v_1-v_0 & v_2-v_0 \end{bmatrix}}_{A} \begin{bmatrix} s \\ t \end{bmatrix}$$

$$\begin{bmatrix} s \\ t \end{bmatrix} = A^{-1} \begin{bmatrix} u-u_0 \\ v-v_0 \end{bmatrix}$$

$$= \frac{\begin{bmatrix} v_2-v_0 & u_0-u_2 \\ v_0-v_1 & u_1-u_0 \end{bmatrix} \begin{bmatrix} u-u_0 \\ v-v_0 \end{bmatrix}}{(u_1-u_0)(v_2-v_0)-(u_2-u_0)(v_1-v_0)}$$

(b) $p(u,v) = p_0 + s(u,v)(p_1-p_0) + t(u,v)(p_2-p_0)$

s,t에 u,v를 대입하면 된다.

$$\begin{bmatrix} \frac{\partial s}{\partial u} \\ \frac{\partial t}{\partial u} \end{bmatrix} = \frac{\begin{bmatrix} v_2-v_0 \\ v_0-v_1 \end{bmatrix}}{(u_1-u_0)(v_2-v_0)-(u_2-u_0)(v_1-v_0)}$$

$$\begin{bmatrix} \frac{\partial s}{\partial v} \\ \frac{\partial t}{\partial v} \end{bmatrix} = \frac{\begin{bmatrix} u_0-u_2 \\ u_1-u_0 \end{bmatrix}}{(u_1-u_0)(v_2-v_0)-(u_2-u_0)(v_1-v_0)}$$

$\frac{\partial p}{\partial u} = \frac{\partial p}{\partial s}\frac{\partial s}{\partial u} + \frac{\partial p}{\partial t}\frac{\partial t}{\partial u}$: 텍스처 좌표의 u축이 3차원 공간에서 향하는 방향

$\frac{\partial p}{\partial v} = \frac{\partial p}{\partial s}\frac{\partial s}{\partial v} + \frac{\partial p}{\partial t}\frac{\partial t}{\partial v}$: '' v