K1 $\quad \underline{r}(u,v) = u(1+v)\,\underline{i} + u^2(1-v)\,\underline{j} + u^3 v\,\underline{k}$

$p = (1,1,0) \implies$ pinnalla $\underline{i} + \underline{j} = \underline{r}(1,0)$

$$\underline{r}_u(u,v) = (1+v)\,\underline{i} + 2u(1-v)\,\underline{j} + 3u^2 v\,\underline{k}$$
$$\underline{r}_v(u,v) = u\,\underline{i} - u^2\,\underline{j} + u^3\,\underline{k}$$

$$\underline{n} = \underline{r}_u(u,v) \times \underline{r}_v(u,v)$$
$$= \underline{r}_u(1,0) \times \underline{r}_v(1,0)$$
$$= (\underline{i} + 2\underline{j} + 0\underline{k}) \times (\underline{i} - \underline{j} + \underline{k})$$

$$\begin{vmatrix} \underline{i} & \underline{j} & \underline{k} \\ 1 & 2 & 0 \\ 1 & -1 & 1 \end{vmatrix} = 2\underline{i} - \underline{j} - 3\underline{k}$$

$$\underline{n} \cdot (\underline{r} - \underline{r}_0) = 0 \quad ; \quad \underline{r}_0 = \underline{i} + \underline{j}$$

$$\iff 2x - y - 3z = 1$$

K2 Pinta $z = x^2 + y^2$

suora $x = y = z$

Leikkauspiste $\left(\frac{1}{2}, \frac{1}{2}, \frac{1}{2}\right) \neq (0,0,0)$

Suoraan: $\frac{\partial z}{\partial x} = 2x$, $\frac{\partial z}{\partial y} = 2y$

Eli:

$$0 = 1 \cdot \left(x - \frac{1}{2}\right) + 1 \cdot \left(y - \frac{1}{2}\right) - \left(z - \frac{1}{2}\right)$$

$$\Longleftrightarrow \quad x + y - z = \frac{1}{2}$$