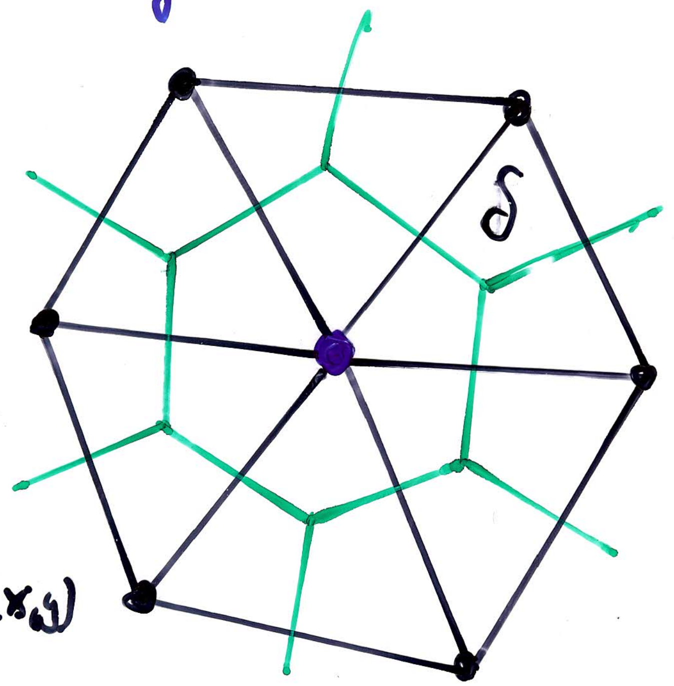
■ FVM = Finite Volume Method:

= modern FDM on non-uniform grids

- Starting Point = Balance Equation:



primary grid $\delta \in T_h$

$x^{(i)}$

$B(x^{(i)})$ secondary grid

$x = (x_1, x_2) = (x, y)$

Let us again consider the Poisson eqn (1)

$-\Delta u = f$ in Ω and $u = g$ on $\Gamma = \partial\Omega$

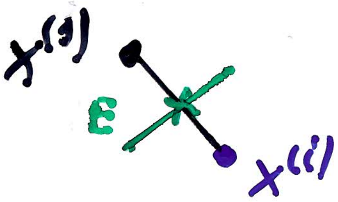
$$-\int_{B(x^{(i)})} \Delta u \, dx = \int_{B(x^{(i)})} f(x)\, dx$$

$$\overset{\text{Gauß}}{\parallel} \qquad\qquad \parallel$$

$$\triangleright \; -\int_{\partial B(x^{(i)})} \frac{\partial u}{\partial n}(x)\, ds_x = \int_{B(x^{(i)})} f(x)\, dx \quad \text{balance eqn.!}$$

$$\parallel \qquad\qquad \parallel$$

$$-\sum_{E \in \partial B(x^{(i)})}^{!} \int_E \frac{\partial u}{\partial n}(x)\, ds_x = \int_{B(x^{(i)})} f(x)\, dx$$



$$\approx \qquad\qquad \parallel$$

$$-\sum_{E \in \partial B(x^{(i)})} \frac{u(x^{(j)}) - u(x^{(i)})}{|x^{(j)} - x^{(i)}|} |E| = \int_{B(x^{(i)})} f(x)\, dx$$