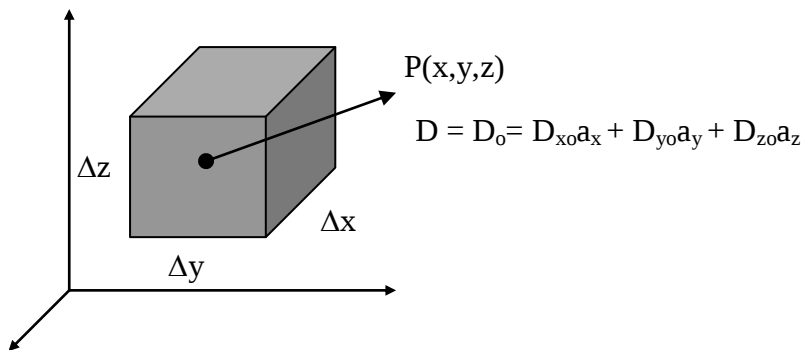




Menurut Hk. Gauss:

$$\oint \mathbf{D}_s \cdot d\mathbf{S} = Q$$

Untuk menghitung integral tertutup dari kotak persegi, maka integral dipecah menjadi 6 integral:

$$\oint \mathbf{D} \cdot d\mathbf{S} = \int_{\text{depan}} + \int_{\text{belakang}} + \int_{\text{kiri}} + \int_{\text{kanan}} + \int_{\text{atas}} + \int_{\text{bawah}}$$

$$* \int_{\text{depan}} = D_{\text{depan}} \cdot \Delta S_{\text{depan}}$$

$$= D_{\text{depan}} \cdot \Delta S_{\text{depan}}$$

$$= D_{\text{depan}} \Delta y \Delta z \mathbf{a}_x$$

$$= D_{x,\text{depan}} \Delta y \Delta z$$

$$D_{x,\text{depan}} = D_{x0} + (\Delta x/2)(\partial D_x / \partial x)$$

$(\partial D_x / \partial x)$ = laju perubahan D_x terhadap x

D_{x0} = adalah D_x di titik P

$$= (D_{x0} + (\Delta x/2)(\partial D_x / \partial x)) \Delta y \Delta z$$

$$* \int_{\text{belakang}} = D_{\text{belakang}} \cdot \Delta S_{\text{belakang}}$$

$$= D_{\text{belakang}} \cdot (-\Delta y \Delta z \mathbf{a}_x)$$

$$= -D_{x,\text{belakang}} \Delta y \Delta z$$

$$D_{x,\text{belakang}} = D_{x0} - (\Delta x/2)(\partial D_x / \partial x)$$

$$= (-D_{x0} + (\Delta x/2)(\partial D_x / \partial x)) \Delta y \Delta z$$

$$\int_{\text{depan}} + \int_{\text{belakang}} = \frac{\partial D_x}{\partial x} \Delta x \Delta y \Delta z$$