FDTD - Electro

continuación

Consideremos $\boxed{(z,t) = [\,(k+2)\Delta z,\,(n+1)\Delta t\,]}$

en la ecuacion

$$\frac{\partial}{\partial t} E_x(z,t) = -\frac{1}{\varepsilon} c \frac{\partial}{\partial t} H_y(z,t)$$

$$\frac{\partial}{\partial t} E_x(z,t) = \frac{E_x[\,(k+2)\Delta z, (n+2)\Delta t\,] - E_x[\,(k+2)\Delta z,\, n\Delta t\,]}{2\Delta t}$$

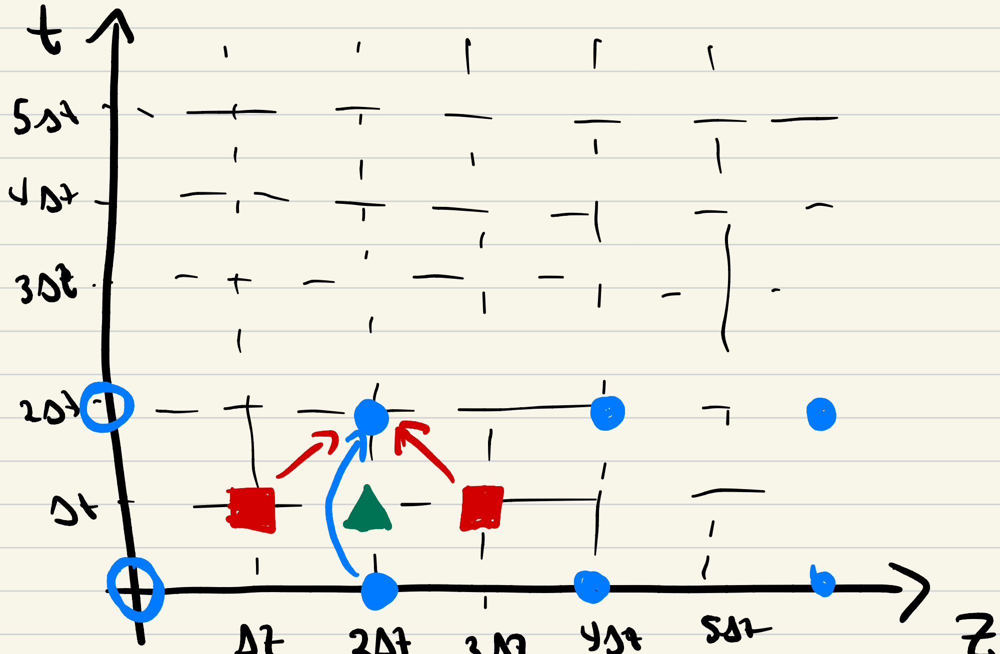
$$= \frac{E_x^{n+2}(k+2) - E_x^{n}(k+2)}{2\Delta t}$$

$$\frac{\partial}{\partial z} H_y(z,t) = \frac{H_y[\,(k+3)\Delta z, (n+1)\Delta t\,] - H_y[\,(k+1)\Delta z, (n+1)\Delta t\,]}{2\Delta z}$$

$$= \frac{H_y^{n+1}(k+3) - H_y^{n+1}(k+1)}{2\Delta z}$$

$$\frac{E_x^{n+2}(k+2) - E_x^{n}(k+2)}{2\Delta t} = -\frac{1}{c}\,\frac{H_y^{n+1}(k+3) - H_y^{n+1}(k+1)}{2\Delta z}$$

$$E_x^{n+2}(k+2) = E_x^{n}(k+2) - \frac{1}{c}\frac{\Delta t}{\Delta z}\left[H_y^{n+1}(k+3) - H_y^{n+1}(k+1)\right]$$



Consideremos $(z,t) = \boxed{[(k+1)\Delta z,\ (n+2)\Delta t]}$

$$\frac{\partial}{\partial t} H_y(z,t) = -c \frac{\partial}{\partial z} E_x(z,t)$$

$$\frac{\partial}{\partial t} H_y(z,t) = \frac{H_y[(k+1)\Delta z, (n+3)\Delta t] - H_y[(k+1)\Delta z, (n+1)\Delta t]}{2\Delta t}$$

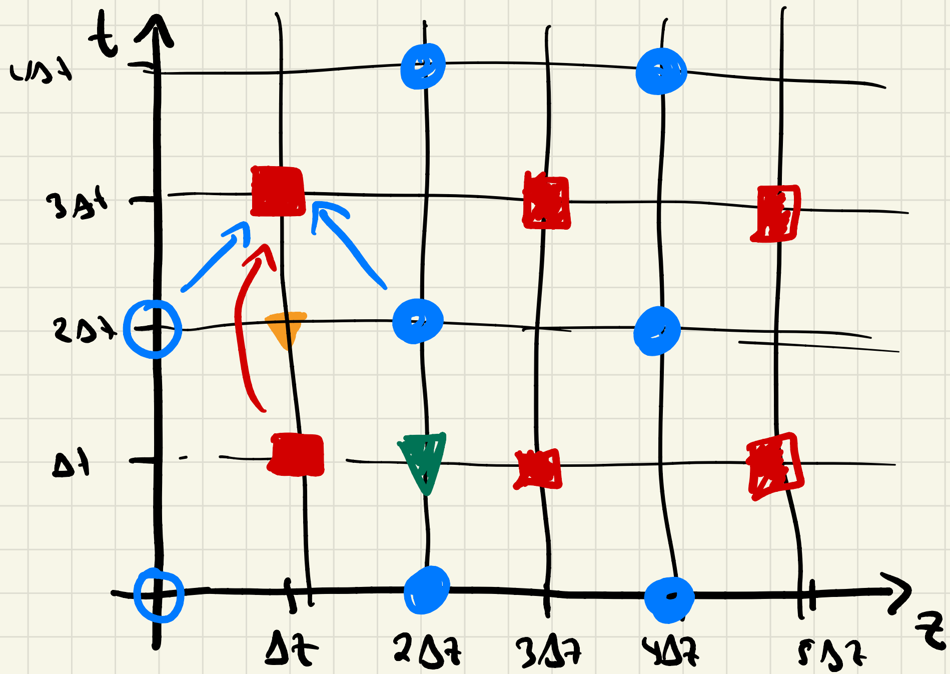
$$= \frac{H_y^{n+3}(k+1) - H_y^{n+1}(k+1)}{2\Delta t}$$

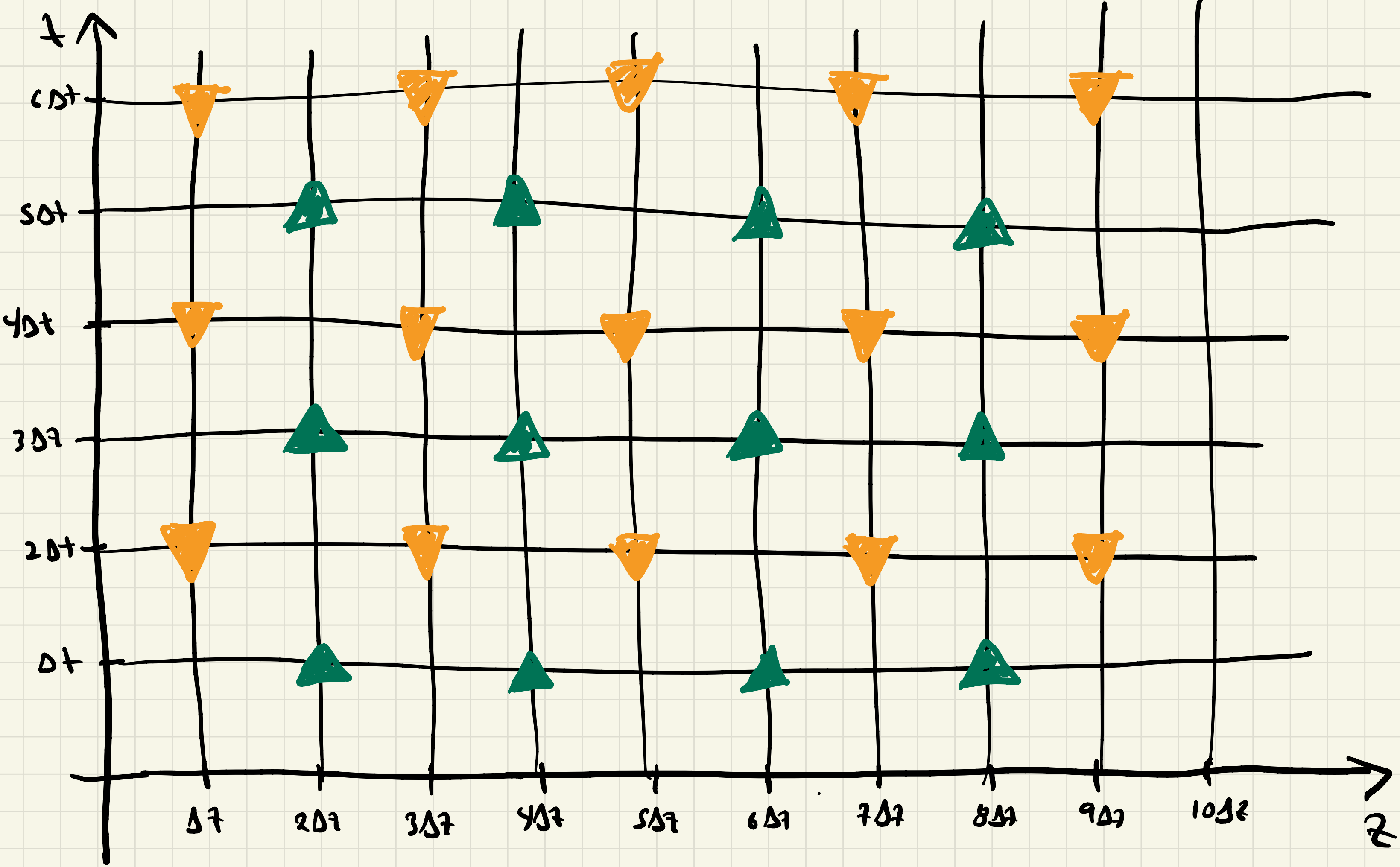
$$\frac{\partial}{\partial z} E_x(z,t) = \frac{E_x[(k+2)\Delta z, (n+2)\Delta t] - E_x[k\Delta z, (n+2)\Delta t]}{2\Delta t}$$

$$= \frac{E_x^{n+2}(k+2) - E_x^{n+2}(k)}{2\Delta t}$$

$$\frac{H_y^{n+3}(k+1) - H_y^{n+1}(k+1)}{2\Delta z} = -\frac{1}{c}\,\frac{E_x^{n+2}(k+2) - E_x^{n+2}(k)}{2\Delta t}$$

$$H_y^{n+3}(k+1) = H_y^{n+1}(k+1) - \frac{1}{c}\,\frac{\Delta z}{\Delta t}\left[E_x^{n+2}(k+2) - E_x^{n+2}(k)\right]$$





t
6Δt
5Δt
4Δt
3Δt
2Δt
Δt
Δz
2Δz
3Δz
4Δz
5Δz
6Δz
7Δz
8Δz
9Δz
10Δz
z