1 Całkowe FDTD

1. $\oint_L \vec{E}d\vec{l} = -\mu \iint_S \frac{\partial \vec{H}}{\partial t} ds$
2. $\oint_L \vec{H}d\vec{l} = \iint_S \left[\sigma\vec{E} + \varepsilon\frac{\partial \vec{E}}{\partial t}\right] ds$

2 James Clerk Maxwell

1. $\nabla \times \vec{E} = -\mu\frac{\partial \vec{H}}{\partial t}$
2. $\nabla \times \vec{H} = \sigma\vec{E} + \varepsilon\frac{\partial \vec{E}}{\partial t} + \vec{j_e}$
3. $\nabla \cdot \vec{D} = \rho \Rightarrow \nabla\vec{E} = \frac{\rho}{\varepsilon}$
4. $\nabla \cdot \vec{B} = 0 \Rightarrow \nabla\vec{H} = 0$

3 Hermann von Helmholtz

1. $\nabla^2\vec{E} - \gamma^2\vec{E} = \nabla(\frac{\rho}{\varepsilon}) + \mu j\omega\vec{J_e}$
2. $\nabla^2\vec{H} - \gamma^2\vec{H} = -\nabla \times \vec{J_e}$
3. $\gamma = \sqrt{j\omega\mu(\sigma + j\omega\varepsilon)}$

4 Klin i inne zwierzątka

1. $\vec{E^i} = \mathbf{1}_z E_0 e^{-j\beta\rho\cos(\phi+\phi')}$
2. $\vec{E^r} = \mathbf{1}_z \cdot (-1) \cdot E_0 e^{-j\beta\rho\cos(\phi-\phi')}$ (miękka)
3. $\vec{E^r} = \mathbf{1}_z \cdot (+1) \cdot E_0 e^{-j\beta\rho\cos(\phi-\phi')}$ (twarda)
4. $\rho = \lambda$ (jeśli nie jest dane)
5. $\sin(x \pm y) = \sin x \cdot \cos y \pm \cos x \cdot \sin y$
6. $\cos(x \pm y) = \cos x \cdot \cos y \mp \sin x \cdot \sin y$
7. $\sin x \pm \sin y = 2\sin\frac{x\pm y}{2} \cdot \cos\frac{x\mp y}{2}$
8. $\cos x + \cos y = 2\cos\frac{x+y}{2} \cdot \cos\frac{x-y}{2}$
9. $\cos x - \cos y = -2\sin\frac{x+y}{2} \cdot \sin\frac{x-y}{2}$
10. $\cos x - \cos y = -2\sin\frac{x+y}{2} \cdot \sin\frac{x-y}{2}$

5 Linia długa

1. $\begin{bmatrix} U(z,s) \\ I(z,s) \end{bmatrix} = \begin{bmatrix} ch(x) & Z_c sh(x) \\ \frac{1}{Z_c}sh(x) & ch(x) \end{bmatrix} \cdot \begin{bmatrix} U_2 \\ I_2 \end{bmatrix} - \begin{bmatrix} E_2(z,s) \\ I_2(z,s) \end{bmatrix}; x = \gamma(d-z)$
2. $\gamma = \sqrt{ZY} = \sqrt{R+sL)(G+sC)}$
3. $Z_c = \sqrt{\frac{R+sL}{G+sC}}$
4. $U(z,s) = \underbrace{H(z,s)E(s)}_{ustalony} + \overbrace{H(z,s)[E_2(0,s) + Z_w I_2(0,s)] - E_2(z,s)}^{nieustalony}$
5. $H(z,s) = \frac{Z_c}{Z_c+Z_w}\frac{e^{-\gamma z} + \rho_o e^{-\gamma(2d-z)}}{1-\rho_o\rho_w e^{-2\gamma d}}$
6. $E_w(z,s) = \mathcal{L}\{e(z,t)\} + Li(z,0^+)$
7. $I_w(z,s) = \mathcal{L}\{i(z,t)\} + Cu(z,0^+)$
8. $\gamma = \frac{s}{V} = s\sqrt{LC}$

6 Ogólne takie tam

1. $\beta = \frac{2\pi}{\lambda}$