

Proiect

2020/2021

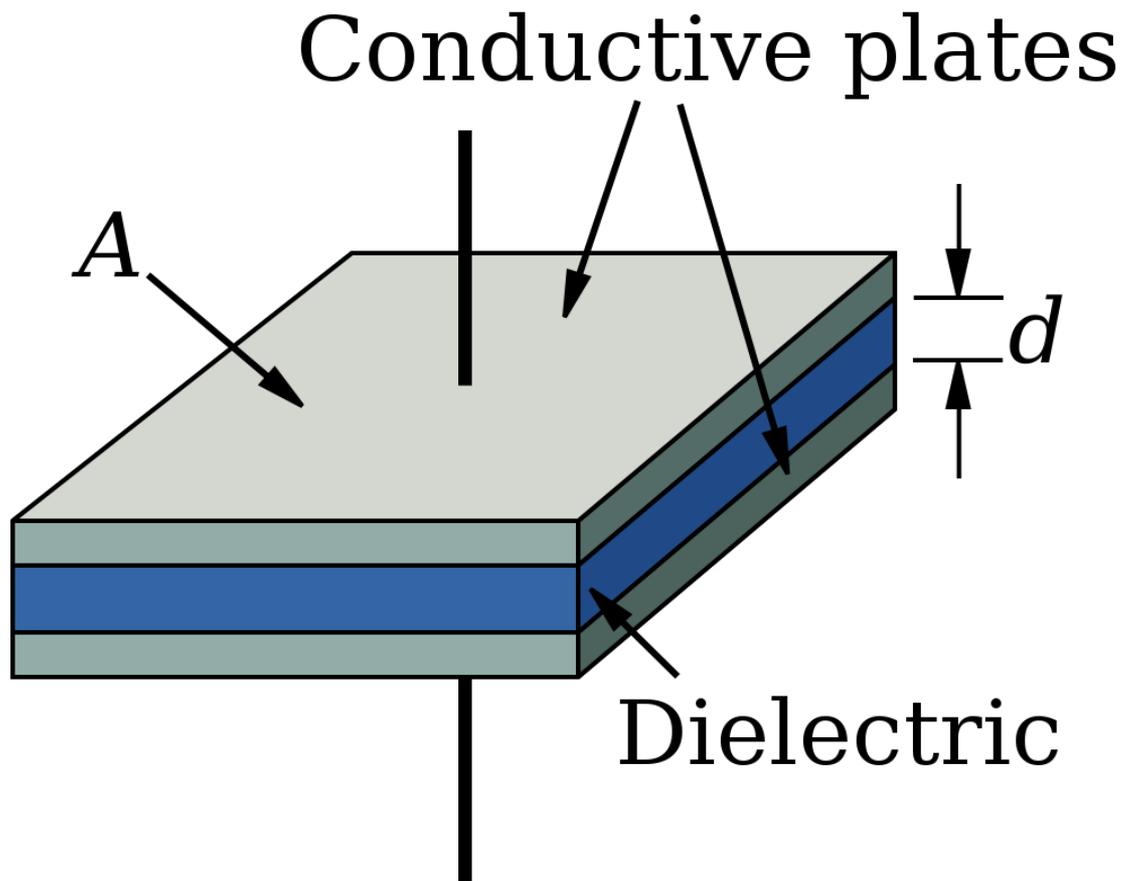
Circuite Integrate Monolitice pentru Microunde

Tema proiect

individuala

Condensator planar

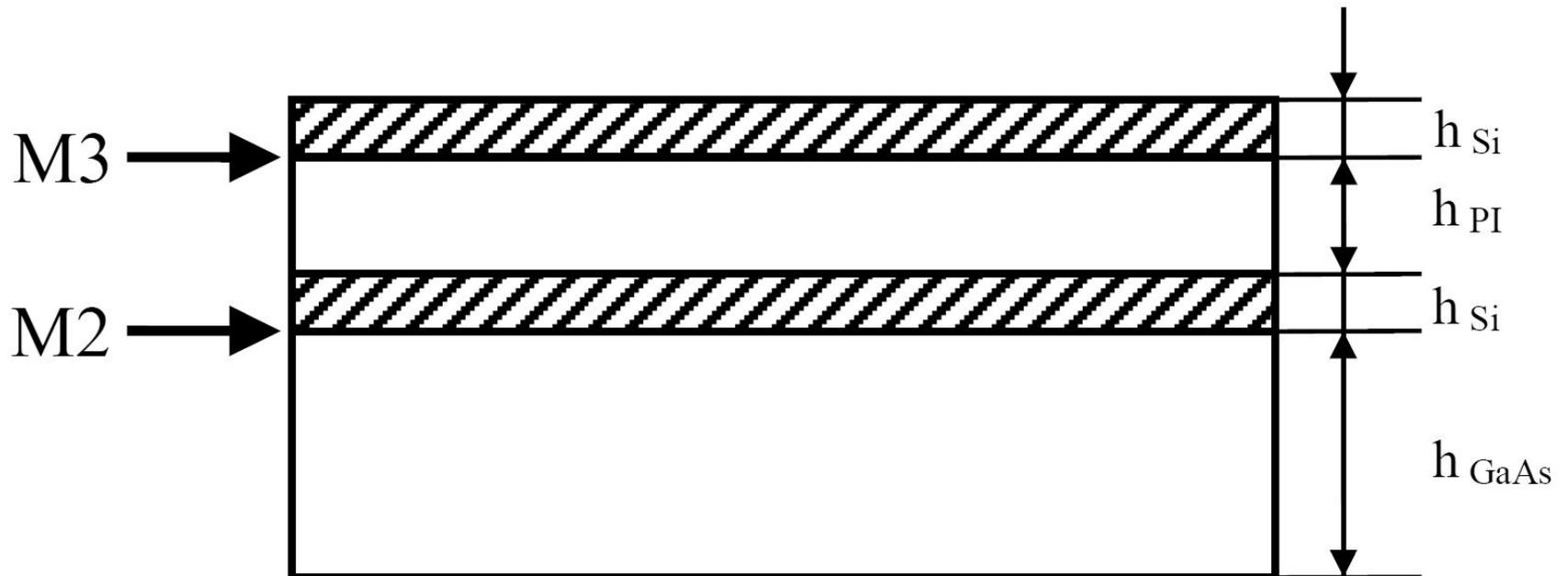
- doua armaturi plane paralele



$$C = \frac{\varepsilon \cdot A}{d}$$

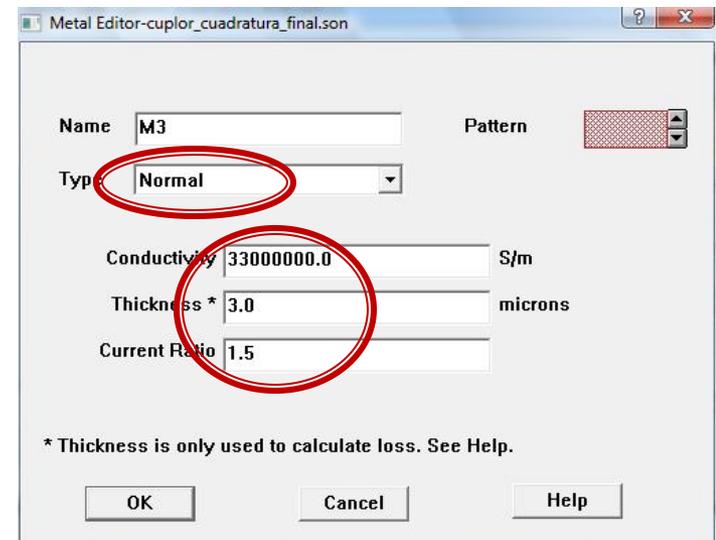
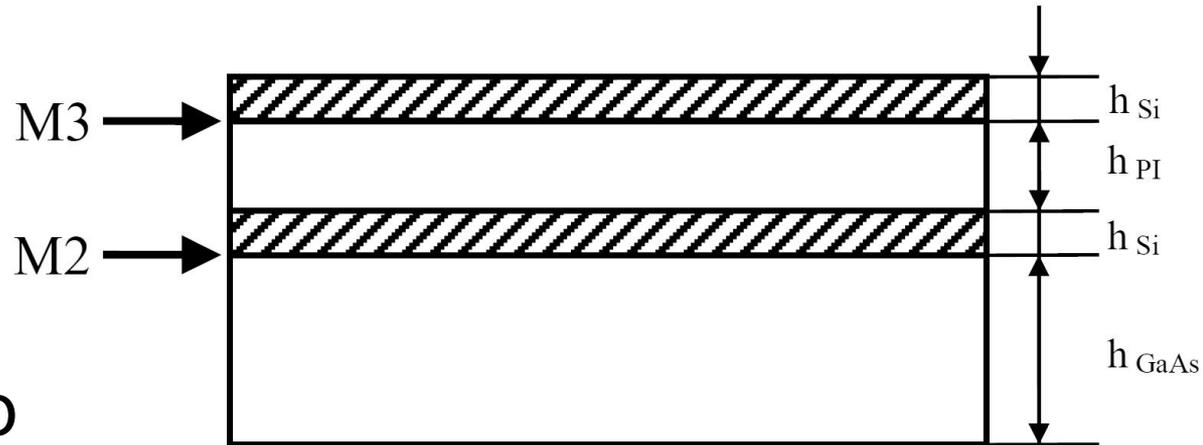
Realizare

- structura tehnologiei (foundry) Plessey



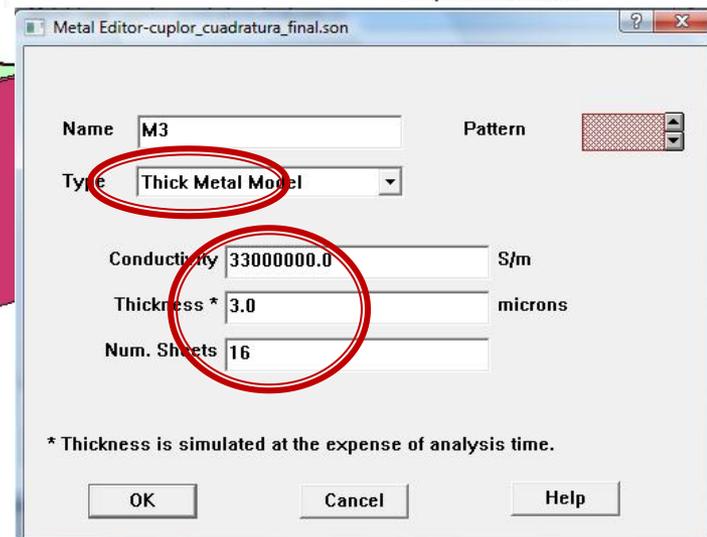
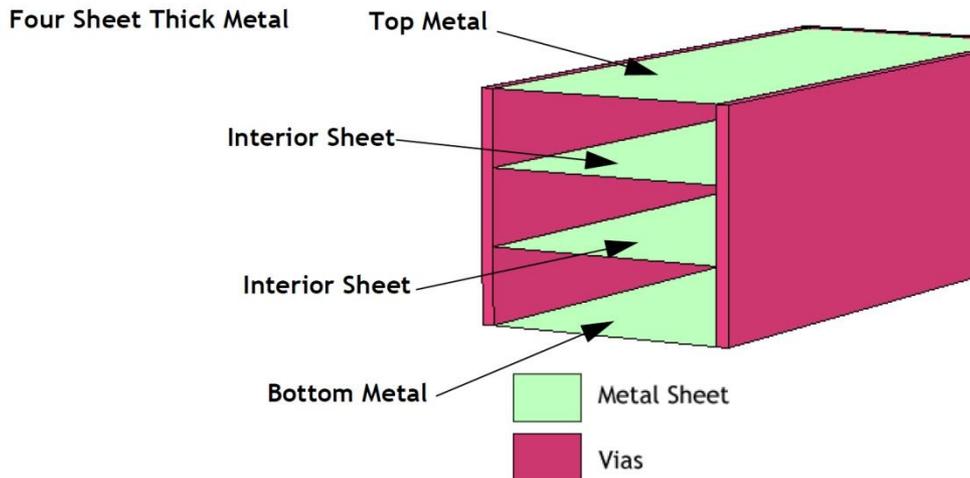
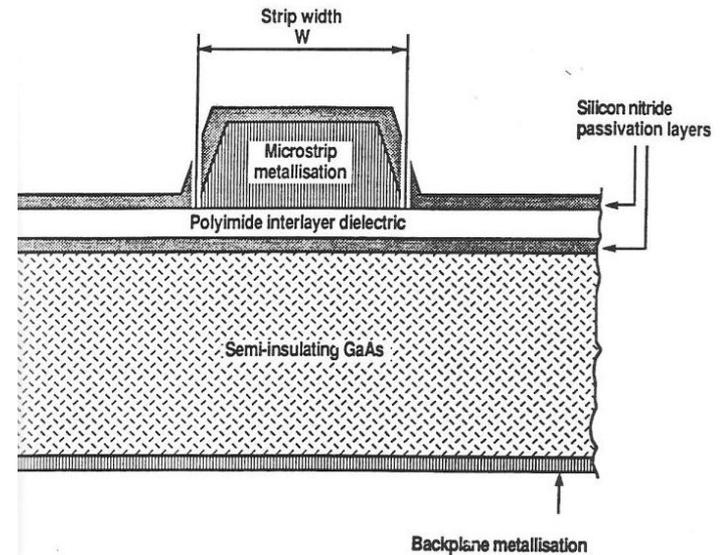
Modelare

- Structuri
 - cu 3 straturi
 - cu 5 straturi
- Metalizare $h=0$
 - Ideal
 - Normal



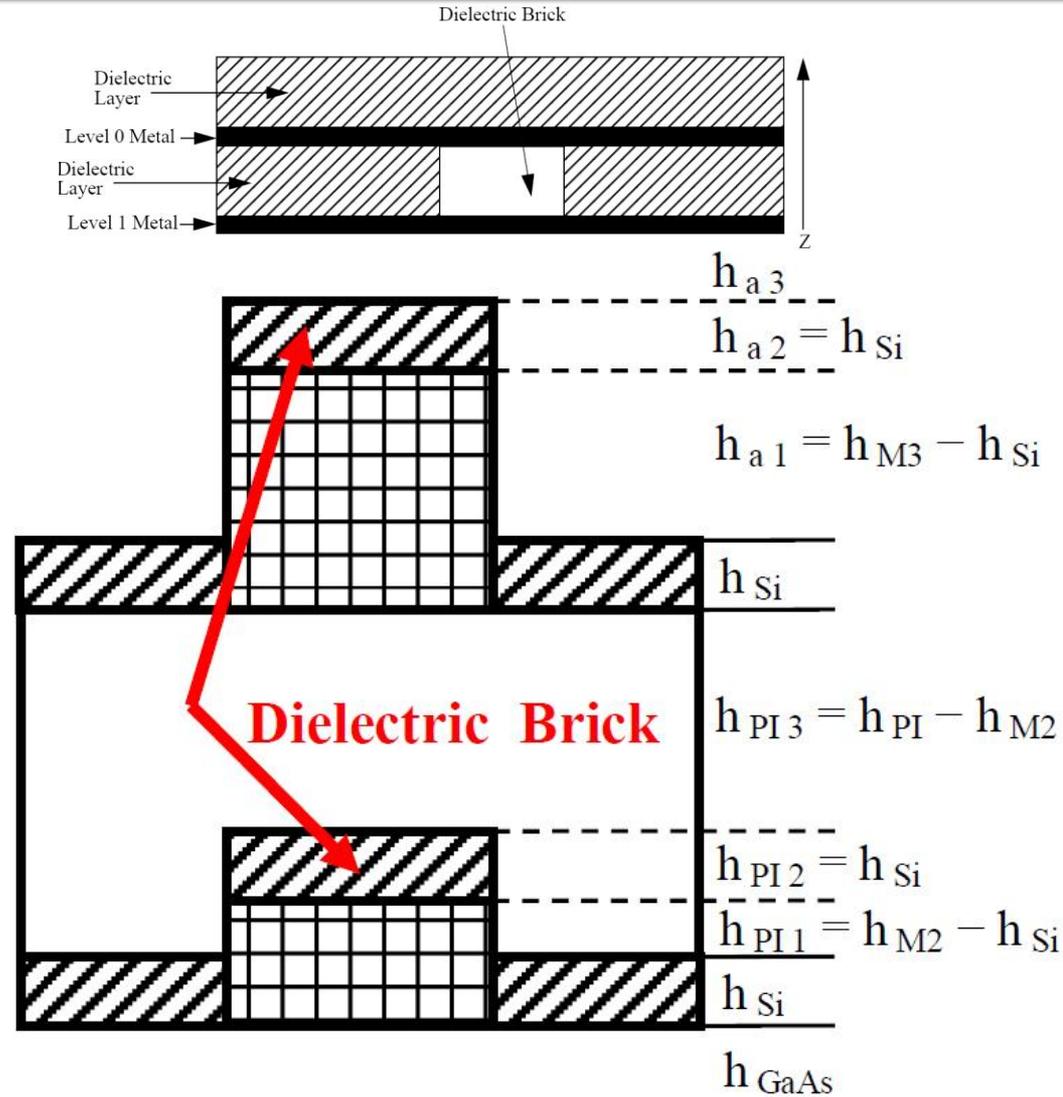
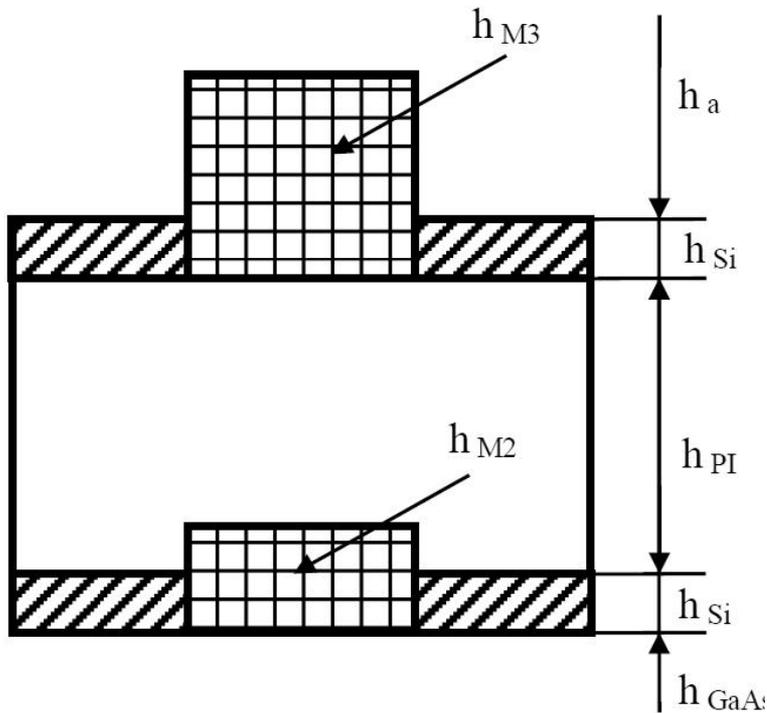
Modelare supliment

- Structuri
 - cu 9 straturi
- Metalizare $h \neq 0$
 - Thick



Modelare supliment

- Structuri
 - cu 5 -> 9+ straturi



Parametri

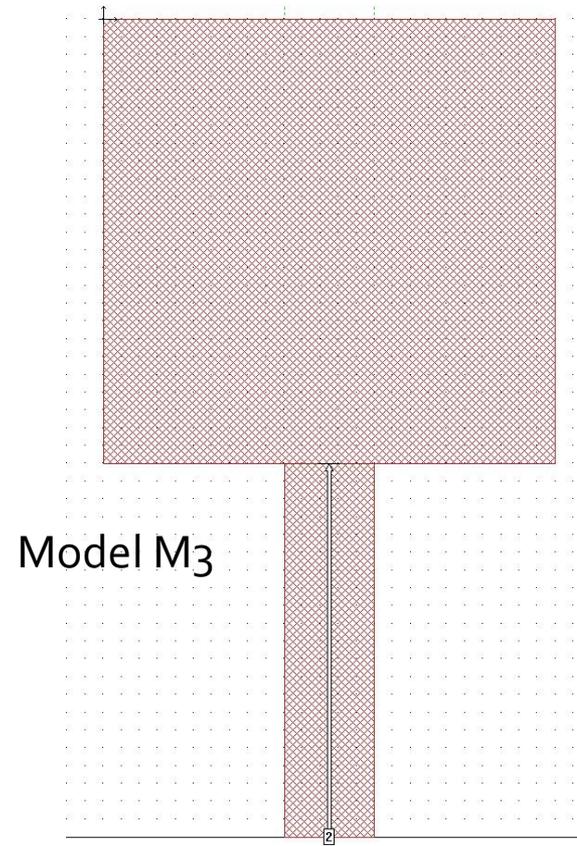
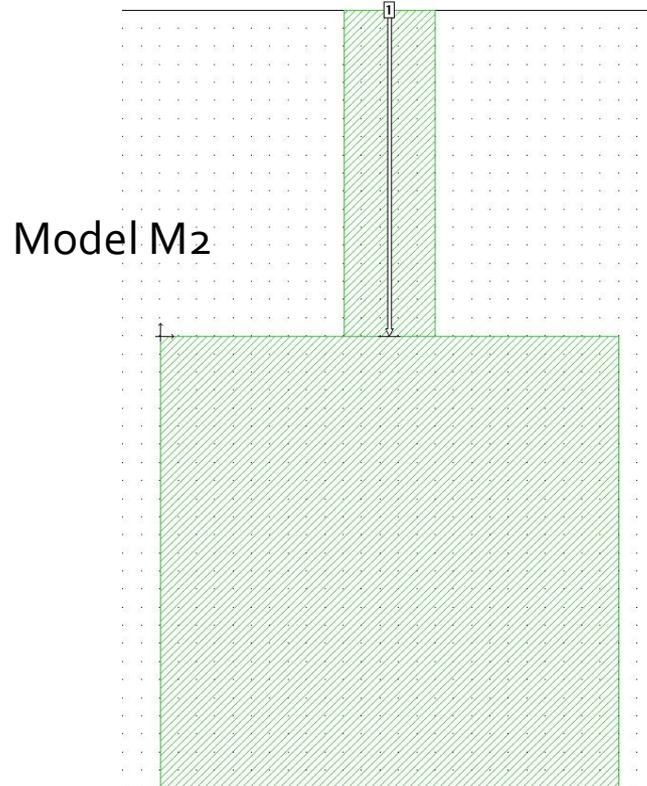
Nr.	Material	ϵ_r	$\tan \delta$	σ [S/m]	R_{sq} [m Ω /sq]	h [μ m]
1	GaAs	12.85	$0.3 \cdot 10^{-3}$			200
2	Si ₃ N ₄	7.2	$15 \cdot 10^{-3}$			0.13
3	PI	3.4	$55 \cdot 10^{-3}$			1.8
4	M2			$3.6 \cdot 10^7$	55	0.5
5	M3			$3.3 \cdot 10^7$	10	3

$$R = \frac{\rho \cdot l}{S} = \frac{l}{\sigma \cdot w \cdot h} = \frac{1}{\sigma \cdot h} \cdot \frac{l}{w} = R_{sq} \cdot \frac{l}{w} \quad l = w \rightarrow R = R_{sq}$$

Simulare

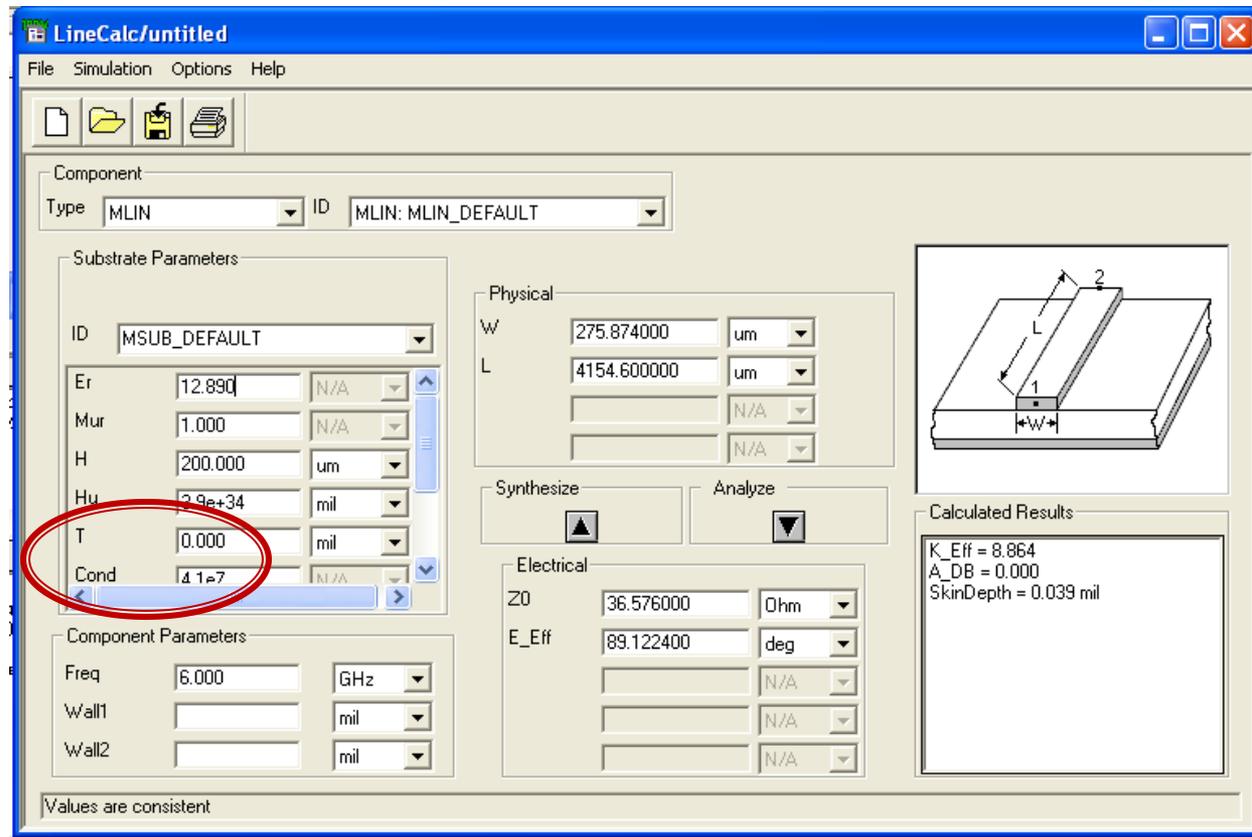
Modelare

- Linii de 50Ω
- Reference plane



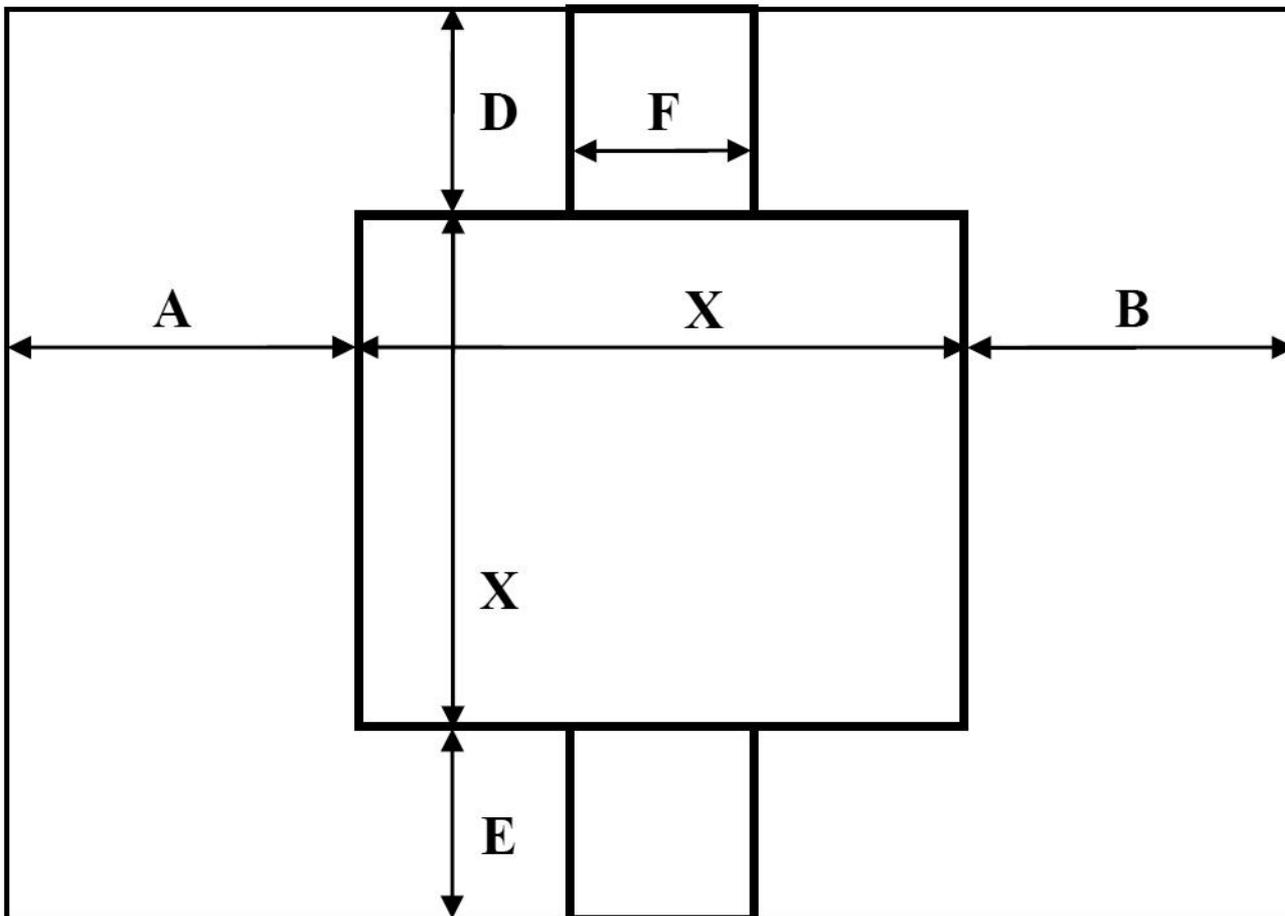
Modelare

- Linii de 50Ω -> Linecalc
- Thickness/Conductivity



Dimensionare

- Box Size/Cell Size



$$X = m \cdot \Delta x$$

$$X = n \cdot \Delta y$$

$$\Delta x = \Delta y$$

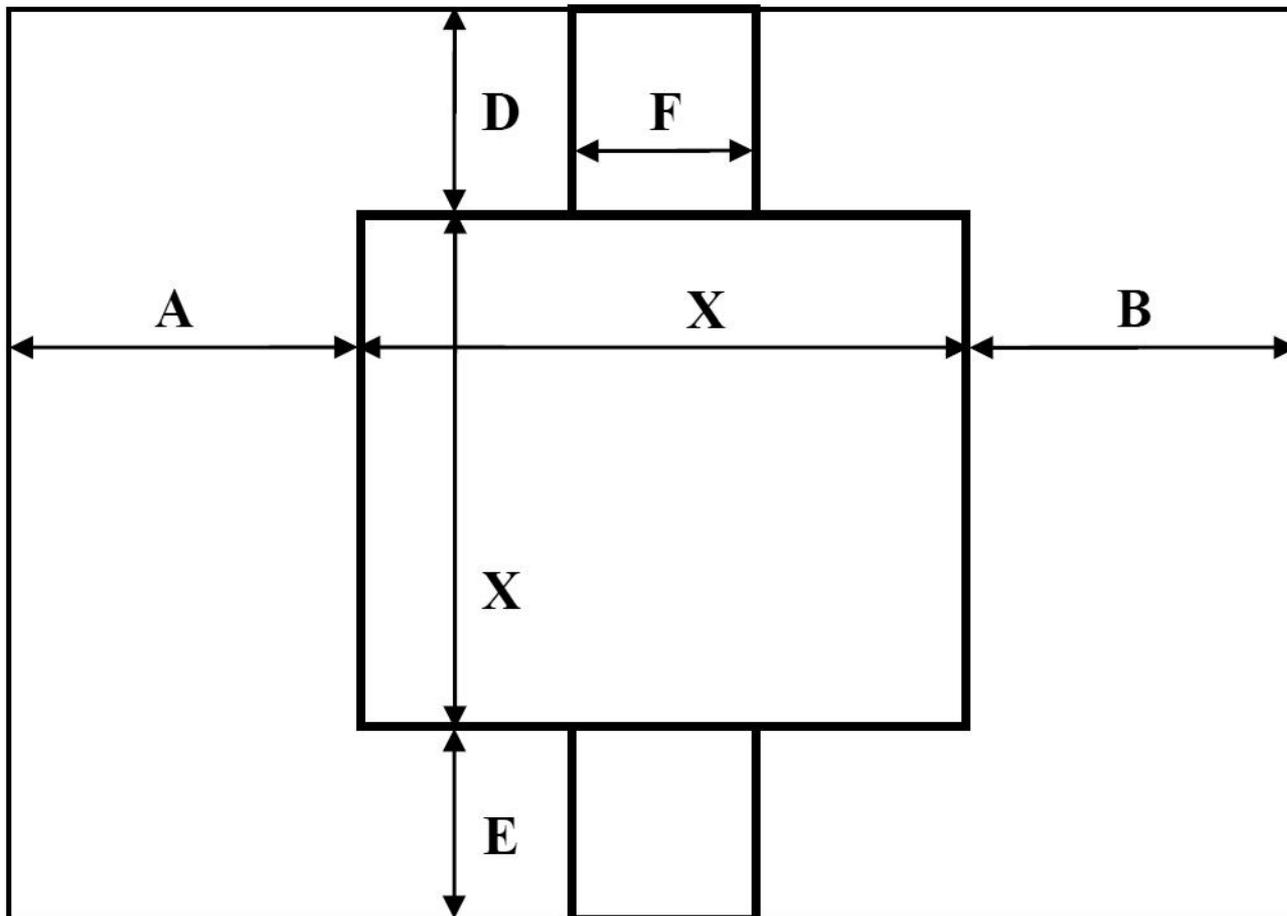
$$m = n = 2^p$$

$$W = H = 2 \cdot X$$

$$W = H = 2^{p+1} \cdot \Delta x$$

Dimensionare

- Box Size/Cell Size



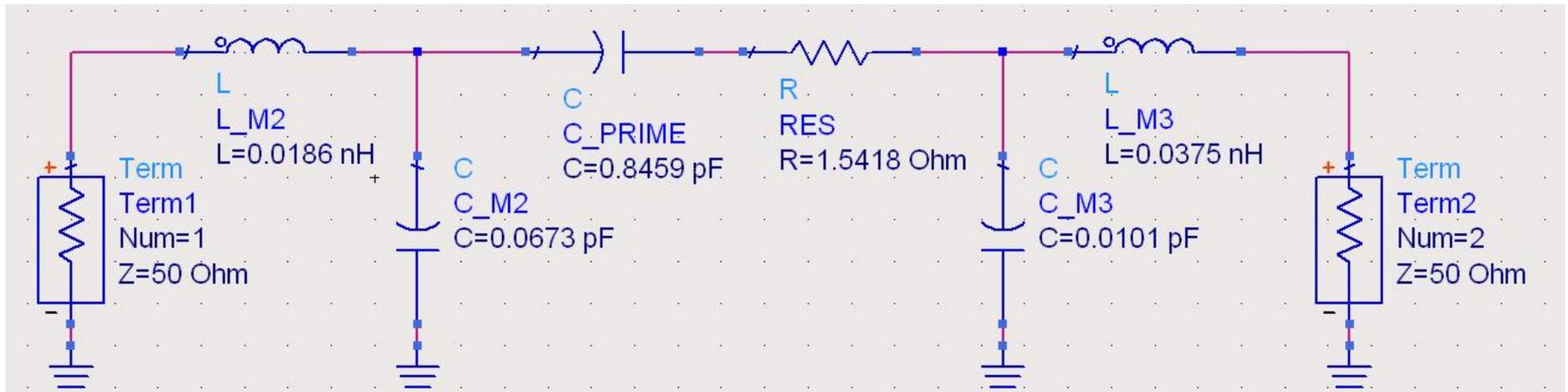
$$F \approx s \cdot \Delta x$$
$$\Delta x = \Delta y$$

$$F \neq s \cdot \Delta x$$
$$\Delta x = \Delta y / 2, 4, 8$$

Circuit equivalent

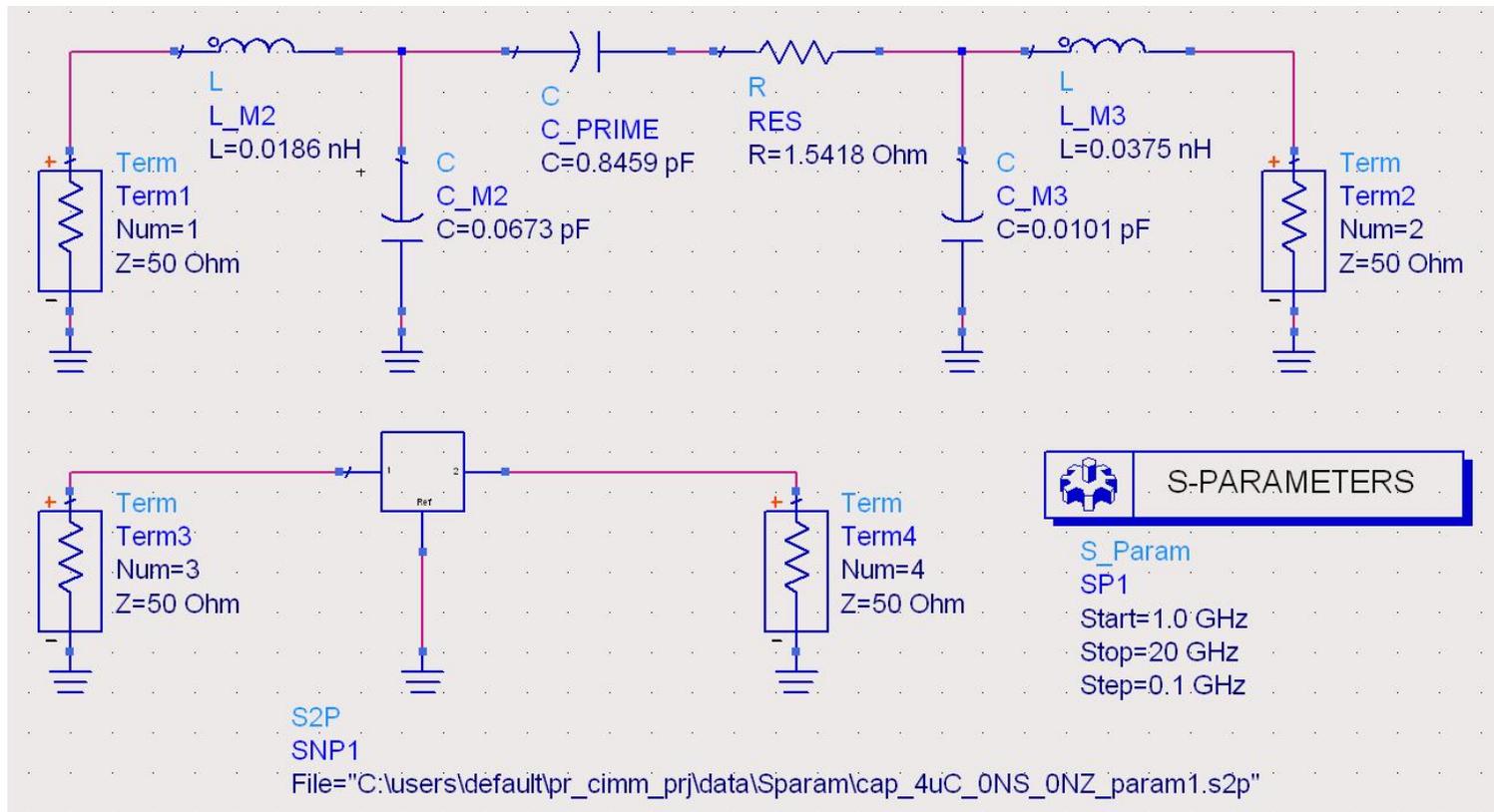
Circuit echivalent

- Sonnet ofera parametrii S
- Schema echivalenta e schema care ofera aceeasi parametri S
- Curs: Schema + Relatii de calcul valori



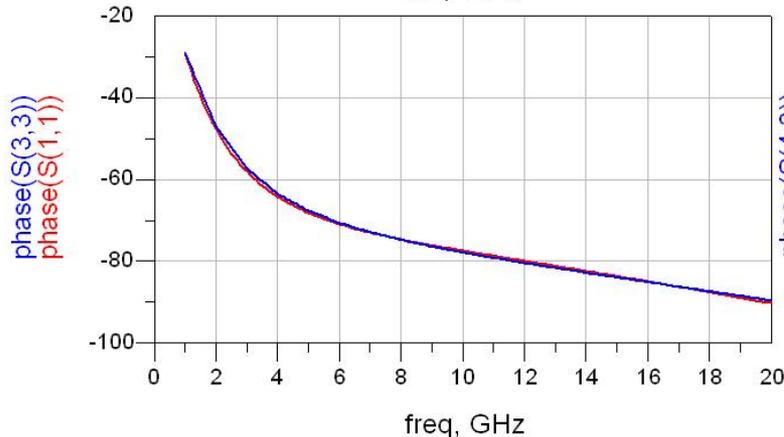
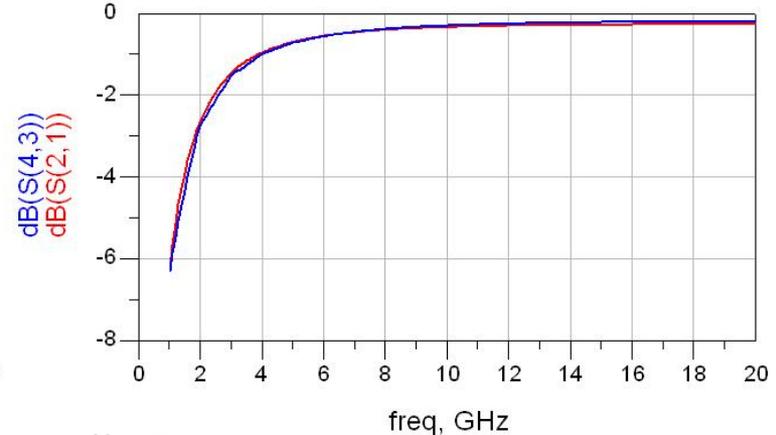
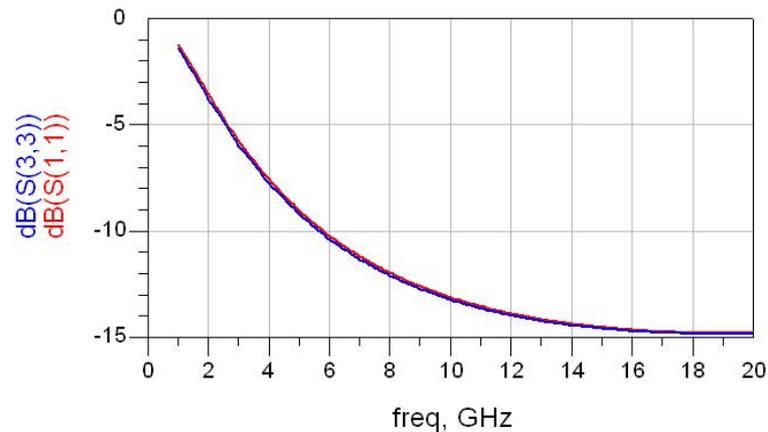
Circuit echivalent

- Optimizare in ADS pentru suprapunerea intre parametrii S pentru schema si parametrii S obtinuti (export) din Sonnet



Circuit echivalent

- Suprapunerea **trebuie** sa tina cont de faptul ca sunt numere complexe: modul / faza

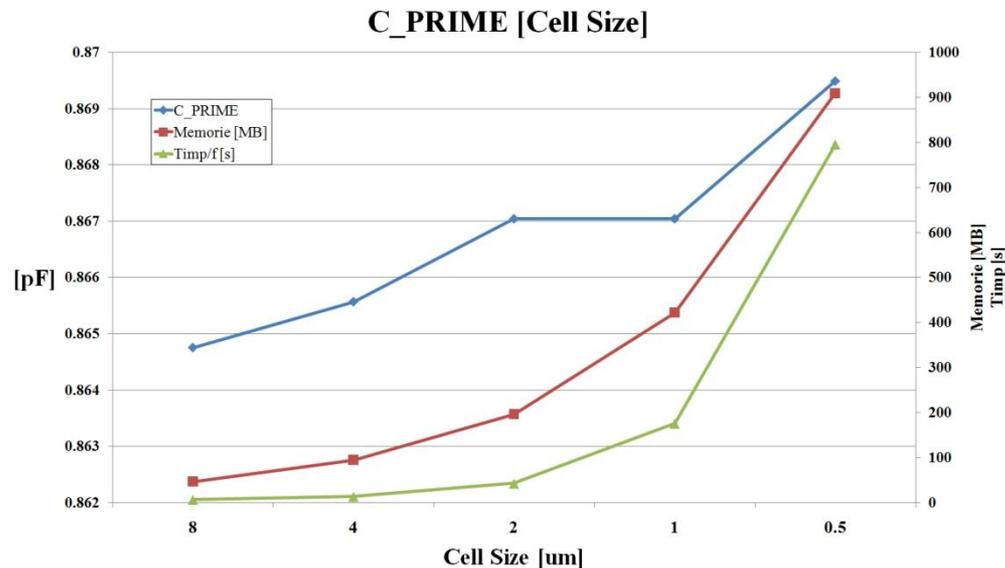


Convergenta

Convergenta

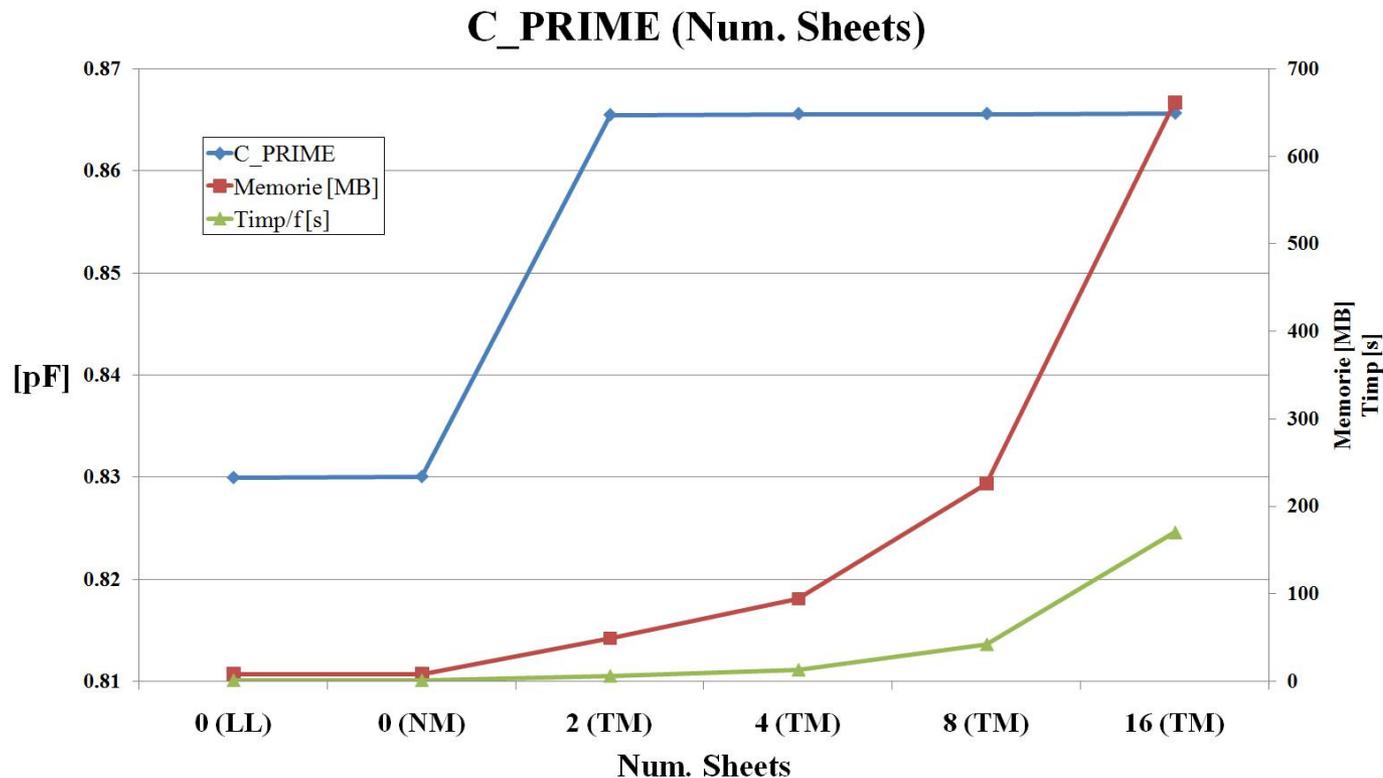
- Controlati cum se modifica elementele din schema (C_{PRIME}) la modificarea celulei
- Macar 3 pasi necesari pentru nota maxima

$$\Delta x, \frac{\Delta x}{2}, \frac{\Delta x}{4}, \frac{\Delta x}{8} \dots$$



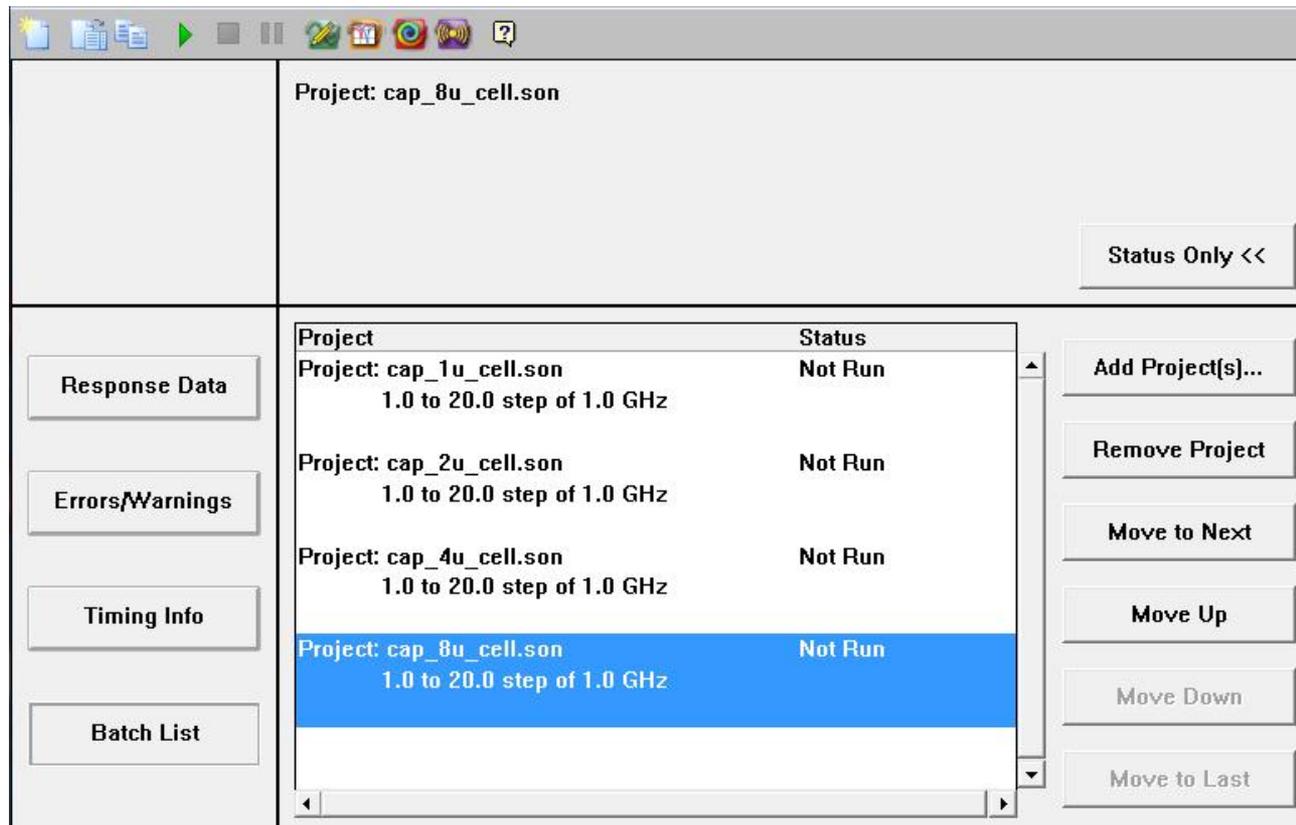
Exemplu

- Afisat si necesarul de timp/memorie
- Analizele cu detalii suplimentare necesita timp (**de calcul**) semnificativ mai mare (exponential/putere)



Calcul automat

- Utilizarea "Batch List" pentru rularea succesiva a mai multor simulari cand calculatorul este neutilizat



The screenshot displays a software interface for managing simulation projects. The main window title is "Project: cap_8u_cell.son". The interface is divided into several sections:

- Top Panel:** Contains the project name "Project: cap_8u_cell.son" and a "Status Only <<" button.
- Left Panel:** A vertical sidebar with buttons for "Response Data", "Errors/Warnings", "Timing Info", and "Batch List".
- Central Table:** A table listing simulation projects with their status. The table has two columns: "Project" and "Status".

Project	Status
Project: cap_1u_cell.son 1.0 to 20.0 step of 1.0 GHz	Not Run
Project: cap_2u_cell.son 1.0 to 20.0 step of 1.0 GHz	Not Run
Project: cap_4u_cell.son 1.0 to 20.0 step of 1.0 GHz	Not Run
Project: cap_8u_cell.son 1.0 to 20.0 step of 1.0 GHz	Not Run
- Right Panel:** A vertical sidebar with buttons for "Add Project(s)...", "Remove Project", "Move to Next", "Move Up", "Move Down", and "Move to Last".

Contact

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