XPEEDIC
ACCELERATE YOUR IC DESIGN

TmlExpert

TmlExpert to Meet All the Transmission Line Needs with 3 Solvers (2D, 2.5D, and 3D)

Highlights

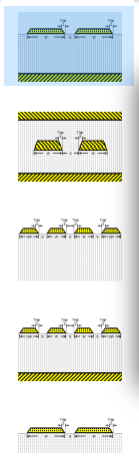
1. Accurate transmission line modeling is essential for high speed PCB system. The requirement can be very different ranging from a simple 2D RLGC simulation to a complicated 3D simulation.
2. TmlExpert is built with the consideration of all the different simulation scenarios.
3. TmlExpert has three solver technologies including 2D RLGC, 2.5D MoM and 3D FEM to achieve the best accuracy and convenience.
4. TmlExpert has various templates for transmission-line structures including hatched ground plane and fiber weave
5. TmlExpert can help design and exploration of advanced transmission lines

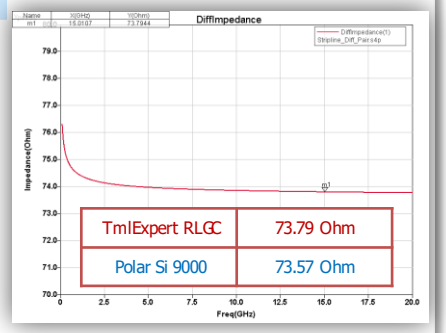
2D Simulation with RLGC Solver

Plenty of TML's suitable for 2D analysis
2D FEM solver with MOR technique supports
- Causal dielectric model
- Conductor rough surface model
- Conductor skin-effect model

Input
- Intuitive GUI
- Easy parametric setup

Output
- RLGC, impedance, attenuation, delay, skew
- S-parameter for a give length
- Auto plot template result
- Export parametric variables to HFSS

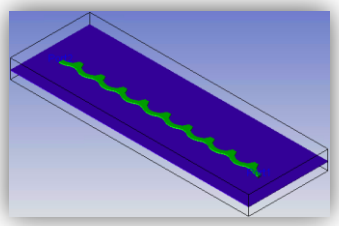


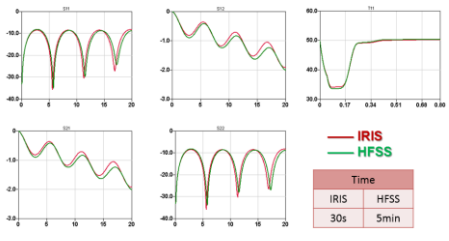


2.5D MOM Analysis

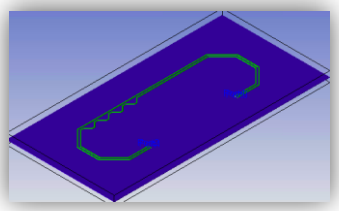
When 2.5D discontinuities exist in a TML, MOM solver is used
Tabbed routing is used in
- pin field to help manage the impedance in this area to match the impedance to the rest of the transmission line on all routing layers.
- open field to help compress routing while improving noise on external layers.

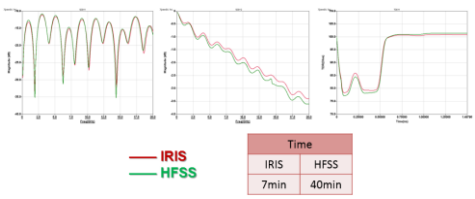
Serpentine is used to match delays within a pair or between two pairs





Time	
IRIS	HFSS
30s	5min





Time	
IRIS	HFSS
7min	40min

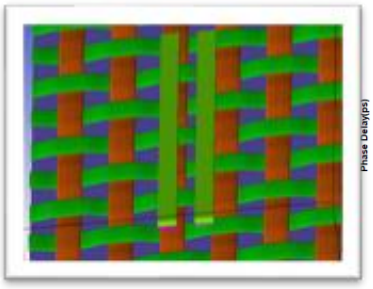
3D FEM Analysis of Fiber Weave Structures

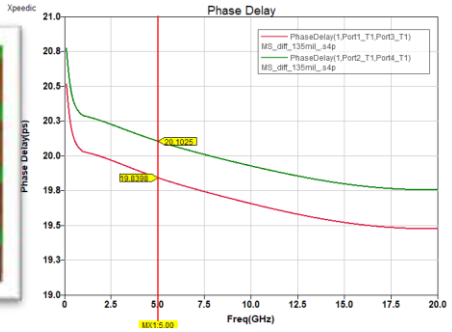
Accurate fiber weave modeling can help to

- Assess the effect of fiber weave on skew and loss in transmission in different direction.
- Characterize skew due to various fiber weave patterns in PCB laminates.
- Investigate possible techniques to reduce fiber weave effect, such as zigzag-style routing
- Balance the trade-off by applying techniques with different trace routing direction or different fiber weave patterns in PCB laminates.

Modeling challenges

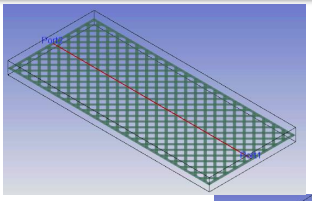
- It is three dimensional and difficult to create model
- It is computationally intensive to simulate

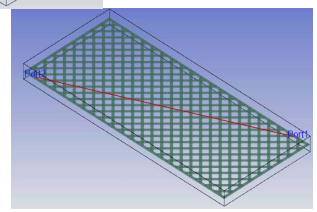


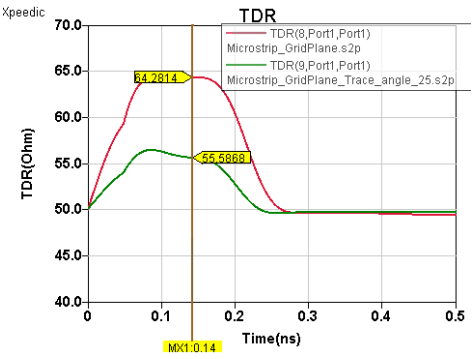


3D FEM Analysis of Hatched Ground Planes

Microstrip and stripline
Option to add EMI shielding layer
Edit hatch style
Orient trace in any angle
Solve the structure accurately and efficiently using 3D FEM
Export to HFSS

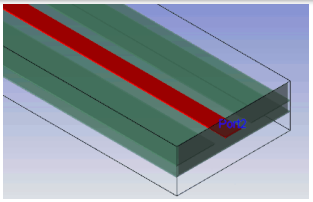


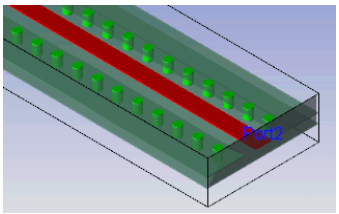


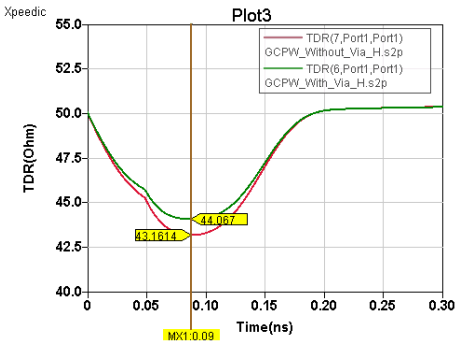


3D FEM Analysis of Grounded CPW

Create grounding vias in no time
Solve the structure accurately and efficiently using 3D FEM
Export to HFSS







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