Nuhertz Filter Design With Parameterized Sonnet Geometry

For Speed and Accuracy
Nature of the Problem

• EM Design Accuracy is by nature slow and time consuming
  – Numerous EM simulations required
  – EM simulation accuracy requires massive number crunching

• Quantum computers not yet available 😞
Best Solution to the Problem

• Be Smart About EM Computational Efficiency
  – Sonnet is an industry leader in minimizing EM computational requirements

• Be Smart About Minimizing Need for EM Computations
  – Synthesis as accurately as possible before EM optimization
  – Optimize with minimal number of EM simulation runs
Filter Design with EM Optimization

• Parameterized Geometry
  – Small set of independent parameters to optimize
  – Each vertex assigned as a dependency to one or more independent parameters as needed
  – Full project integrity maintained as independent parameters are adjusted.

• Sonnet 17 Provides for All of the Above
Simple Interdigital Example
FilterSolutions Synthesis

- Synthesis and Circuits Optimization are Simple and Routine
- Nonadjacent resonator coupling leads to difficulties in EM response
Simple Interdigital Example
Sonnet EM Simulation

- Sonnet EM simulation shows undesirable resonator coupling effects
Sonnet Interdigital Example
Independent Design Parameters

- Independent design parameters exported directly into Sonnet project
Simple Interdigital Example

Sonnet Optimization Solution

• Optimization Goals Exported Directly Into Sonnet EM Project
• Sonnet executes project optimization to achieve desired goals as close as possible
Simple Interdigital Example
Execute Simulation

• Parameter variables are automatically adjusted as needed
• Accurately optimizes the S12 and S11 of the graph