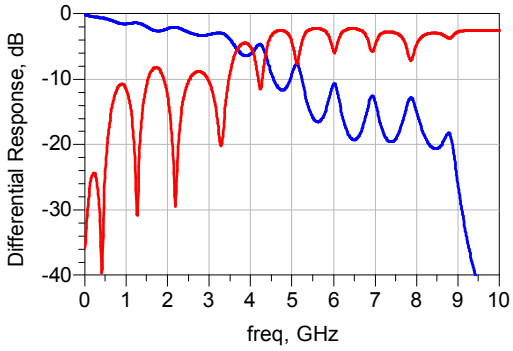

A 2-day advanced training class with
Dr. Eric Bogatin, Signal Integrity Evangelist

SPSI: S-Parameters for SI

Unlock the secrets of S-Parameters for Signal Integrity Applications

Now with hands on labs!

This two-day advanced class shows you how to unlock the power of S-Parameters for signal integrity applications. In a 4-port measurement, there are more than 400 different S-Parameter terms, including single ended, differential, frequency domain and time domain formats, either as step response or impulse response. Each term tells another piece of the interconnect's story.

This class enables you to tap into the secrets locked inside S-Parameters and walks through the details of interpreting the measured or simulated results of 1-port, 2-port, 4-port and even 8-port S-Parameters as single ended, differential in the frequency domain and the time domain. Topics include:

The value of Insertion and return loss
Single ended and differential S-parameters
How to extract characteristic impedance and differential impedance
Identifying mode conversion problems and solutions
The ten item check list to evaluate all S-parameters
The four most important patterns you will see and what they tell you

Now with hands on labs!

Unique to Bogatin Enterprises classes, we give you the software tools to simulate, analyze and view Touchstone files and manipulate the data into a format that gets you to the correct answer faster.

We give you a copy of QUCS, a powerful and easy to use S-parameter viewer and simulator. It runs on any computer with a Windows OS. We show you how to use it to extract valuable information from any Touchstone file and even how to simulate S-parameters. The software and all the Touchstone example files are yours to keep.

By special arrangement, we also give you access to Mentor Graphics HyperLynx to run hands on labs we created specifically for this class. These labs illustrate how to synthesize S-parameters, display them in the time and frequency domain and use behavioral models in simulations. The labs are homework to be completed after class.

Be The Signal

How Do I Register?
Online at www.beTheSignal.com,
info@beTheSignal.com for questions and group discounts.
Schedule is online at www.beTheSignal.com

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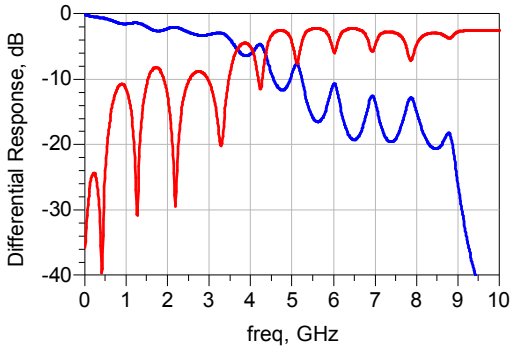

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Class Outline

Day 1	Day 2
01 S-Parameters • The secret to understanding S-parameters • S-parameters and touchstone files • Port impedance • Frequency and time domain • Opening the lid to the black box	**05 Differential S-Parameters** • Converting from single ended to differential • Differential TDR, even and odd mode impedance • SDD, SCC and phase of S21 • Time domain of SCC, SDD • Example systems
02 1-Port, Time and Frequency • Input impedance, L and C • When to adjust the port impedance • TDR, Z0 and TD • TDR, topology and discontinuities • Hacking: building high bandwidth models	**06 Mode Conversion** • Root cause • The SCD, SDC terms • Using time domain to locate conversion • Simulating and measuring mode conversion • Example systems
03 Patterns in Return and Insertion Loss • Return and insertion loss connection • Ripples • Losses • Stub resonance • High Q coupling	**07 Cross Talk: single and diff** • Time domain patterns in NEXT, FEXT • Frequency domain patterns in NEXT, FEXT • Coupling and SDD, SCC • Location of coupling from NEXT • 8-port S-parameters and channel to channel XTK
04 Uniform Transmission Lines • Extracting Z0 • Matching port impedances: self normalized • Extracting TD, Dk from phase of return loss • Conductor and dielectric loss • Figures of merit	**08 Using S-Parameter Models** • Check list to review a new model • Passivity, reciprocity and causality • Reducing the number of ports • Integrating S-parameter behavioral models • Examples

Visit **www.beTheSignal.com**