HEWLETT PACKARD

HP Momentum for Series IV Users

Technical Data

Course Overview

This one-day course shows the student how to use Momentum in a hands-on lab environment. After a brief overview of the Momentum interface and the engine, five lessons follow that show how Momentum is used in the design process to get S-parameter results quickly and to refine subsequent designs. Much of the course focuses on designing a patch antenna to meet specifications. A first approximation antenna is designed and solved. Then the design is modified using a via in a multi-layered substrate. The Adaptive Frequency Sampling (AFS) algorithm and the Edge Mesh feature are used to obtain accurate S-parameter data that is automatically plotted by the graphics server. The radiation pattern is also plotted and the optional Visualization feature is used to display the results. Other lessons demonstrate how to return Momentum data to the Series IV simulator, how to manage Momentum files, and how to set up and solve coplanar waveguide circuits.

Course Features
Upon successful completion of this course, the student will be able to use Momentum for:

- Designing passive circuits
- Using Momentum data in Series IV circuit simulators
- Solving circuits that are not appropriate for HFSS
- Solving circuits with multi-layered substrates and vias
- Solving circuits that have no electrical models (arbitrary layout geometrics)
- Coplanar Waveguide analysis
- Viewing radiation patterns
- Viewing currents

Course Number: E4665A+24D (Scheduled)

Specifications

Course Length
1 day

Audience
Designers who want accurate solutions to a variety of passive circuits.

Prerequisites
Familiarity with basic RF/Microwave concepts and circuit design techniques. Also, familiarity with Series IV is desirable but not required.

Delivery Method
Classroom, Dedicated

Ordering Information

To order HP Momentum for Series IV Users (E4665A+24D) course in the U.S. call 1-800-HPCLASS (800-472-5277).

HP's Customer Registration Center can provide you with price, scheduling, and enrollment information about dedicated class delivery.

Outside the U.S., contact your nearest local HP sales office.

HP Education Services: Your Key to Higher Productivity

Classroom Training Benefits

Experienced HP Instructors
Learn from an experienced HP instructor who is an expert in using HP EEsof simulation and design software to meet real-world design challenges.

Available at HP Classrooms or Your Site
Take advantage of HP's learning facilities, equipment, and interactive learning environment by attending class at an HP facility. Or, save travel expenses and time by organizing a dedicated class at your location.

Extensive Hands-on Practice
HP classroom training is characterized by extensive hands-on experience and interactive class discussion. HP classroom training pays off immediately because it is geared to real-world solutions.

Comprehensive Student Materials
Copies of course materials are provided for future reference on the job.

Regularly Scheduled Classes
Plan training months in advance.

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Detailed Course Agenda

Series IV Momentum Basics

- What is Momentum?
- Basic Momentum Use Model
- How are Circuits Analyzed?
  - Substrates
  - Mesh
  - Planar Solver
- When Should you Use Momentum?
- The Momentum User Interface
- The Momentum Engine
- Which Menus are Used the Most?
- How are Substrates Defined?
- Dialog Box Used to Define Substrates
- How is the Mesh Created?
- Typical Custom Mesh
- Typical Visualization Pattern
- Momentum Examples
- Example: Spiral with Hole in Ground Plane
- Spiral Mesh Pattern

Getting Results Quickly

- Lab: Microstrip Meander Line
- Step 1: Open the Momentum Example: Learn_MOM_prj
- Step 2: Copy the example (line.dsn)
- Step 3: Open a New Project Directory
- Step 4: Paste the Copy (line.dsn)
- Step 5: Synchronize to Layout
- Step 6: Start the Momentum Interface
- Step 7: Analyze the Circuit in Momentum
- Step 8: Visualize the Current

Using Momentum as a Design Tool

- Lab: Patch Antenna with Side Feed
- Typical Design Problems
- Patch Antenna Design Specifications
- Calculations for length (l) and width (w)
- Step 1: Build the Schematic
- Step 2: Open a Test Bench
- Step 3: Simulate in the Circuit Simulator
- Step 4: Synchronize to Layout and Start Momentum
- Step 5: Setup and Solve the Substrate
- Step 6: Setup and Solve the Mesh
- Step 7: Analyze using AFS
- Step 8: Examine the Interface: ports, interrupts, files
- Step 9: Output and Compare the Results
- Optional - if you have time: Visualize the Current

Improving a Design with Momentum

- Lab: Modifying the Patch Antenna Design
- Via-Fed Patch Antenna Design Representation
- Step 1: Save layout and Setup for Momentum
- Step 2: Redraw the Patch Antenna in Layout
- Vias in momentum
- Step 3: Send the Layout to Momentum
- Step 4: Setup the Substrate
- Step 4: Setup a Custom Mesh
- Step 5: Analyze Using AFS
- More About Vias and Meshing
- Step 6: Compare the Results
- Step 7: Visualize the Current Magnitude
- Step 8: Plot the Radiation Pattern

Momentum Techniques

- Momentum Data in the Circuit Simulator
- Designing a 3 dB Splitter:> 30 dB Isolation (5-6 GHz)
- Use Model for Momentum Data Use in the Simulator
- Step 1: Copy the Schematic and Synchronize to Layout
- Step 2: Place Ports and Start Momentum
- Step 3: Set Up the Mesh
- Step 4: Analyze Using AFS
- Step 5: Import the Momentum Data
- Step 6: Use the AFS Data
- Step 7: Add the TFR and Ports then Synchronize
- Step 8: Open the Test Bench and Tune the TFR
- Schematic Results from the Circuit Simulator

Advanced Topics

- Two Areas for Momentum Files
  - Project Directories and Files
- Coplanar Waveguide - CPW
  - Momentum Coplanar Ports
  - How to Define Coplanar Ports

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