MOMENTUM for ADS 2002

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LAB 1: Momentum Basics

Microstrip Meander Line

This lab exercise introduces the basic use model of the Momentum interface for solving passive circuits: the design is a supplied microstrip meander line.

Note on using ADS for Momentum

This lab exercise contains some basic ADS operations not specific to Momentum. Therefore, if you are new to ADS, be assured that those basic steps have been included in this lab exercise. If you are an experienced ADS user or have taken an ADS course, you should already know how to perform such steps as S-parameter simulation and displaying of ADS data. In that case, you should finish the lab exercise quickly and easily, giving you time to do the optional exercises at the end.

OBJECTIVES

- Synchronizing the schematic to layout
- Checking the Substrate, Ports and Mesh definition
- Setting up the simulation
- Displaying the results in the ADS data display window

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LAB 2: Momentum RF Mode

RFIC Launch

This lab exercise introduces the RF Mode operation. In general, RF mode is for lower frequency designs with complex geometry. For the appropriate circuits, this RF mode is a much faster simulation than full meshing regular solution Momentum and retains accuracy.

OBJECTIVES

- Use Momentum RF Mode
- Pre-compute different Meshes
- Set and run the Momentum RF mode simulation
- Display S-parameter results
- Visualize currents in the structure

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LAB 3: Designing with Momentum

Via Fed Patch Antenna

This lab exercise shows how to draw a patch antenna with a via, setup multiple substrate layers, and simulate the antenna response. Afterwards, the far field pattern can be viewed.

OBJECTIVES

- Draw exact structures
- Create multi-layer substrate definitions
- Define and draw vias
- Mesh individual drawing layers
- Reuse simulation files
- Plot the impedance of the structure
- Plot Far Field radiation patterns

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LAB 4: Momentum Techniques

3dB Splitter with internal ports, look-alike component

This lab will test your knowledge of the Momentum interface. All of the basic interface commands and control are assumed. This means that you already should know how to use the Momentum interface to set up and solve the substrate, mesh, and simulation.

The splitter schematic will be generated into layout. From there, you will solve the mesh and learn about internal ports. Additionally, you will simulate a layout look-alike component from the schematic and also solve the splitter with a TFR.

OBJECTIVES

- Generate layouts from ADS schematics
- Identify and control layout layer settings (MSUBs and ports)
- Set the size of port arrows generated in layout
- Understand Internal ports
- Create a layout look-alike for schematic simulation
- Plot results with a TFR added to the splitter

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LAB 5: Optimization

3 GHz Band Reject Microstrip Filter

This lab introduces Momentum's unique ability to modify the shape of the geometry to achieve S-parameter goals that you define. The circuit used for the exercise is simple, but the concepts and steps covered also apply to more complex problems.

OBJECTIVES

- Partial design of a 3 GHz notch filter with 35 dB of rejection
- Use of the Momentum Optimizer
- Layout drawing techniques

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LAB 6: Advanced Topics

CPW Line and Filter

This lab assumes you know how to use the Momentum interface as practiced in the previous lab exercises, with the exception of the optimization menu. Although this lab uses a coplanar structure, there are other topics covered including drawing air bridges, using layout commands, and defining port polarity.

No project files are required because you will draw the coplanar structure in ADS layout using the directions in this exercise.

NOTE –This is a 2-part lab, you can do either or both parts.

OBJECTIVES

- Draw CPW as metal or slot layers
- Use air bridges correctly
- Stretch geometry drawings
- Define infinite and finite ground planes
- Specify the correct port types

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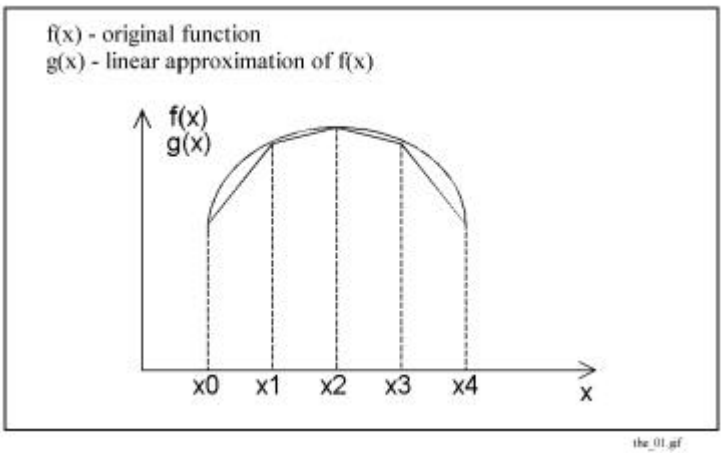
Appendix: Momentum Theory and Related Topics

This appendix introduces the basic concepts of the Momentum theory for solving passive circuits. By studying this material, you will have a basic understanding of:

- Current Modeling
- Method Of Moments
- Momentum RF mode
- AFS
- Calibration
- Edge Mesh

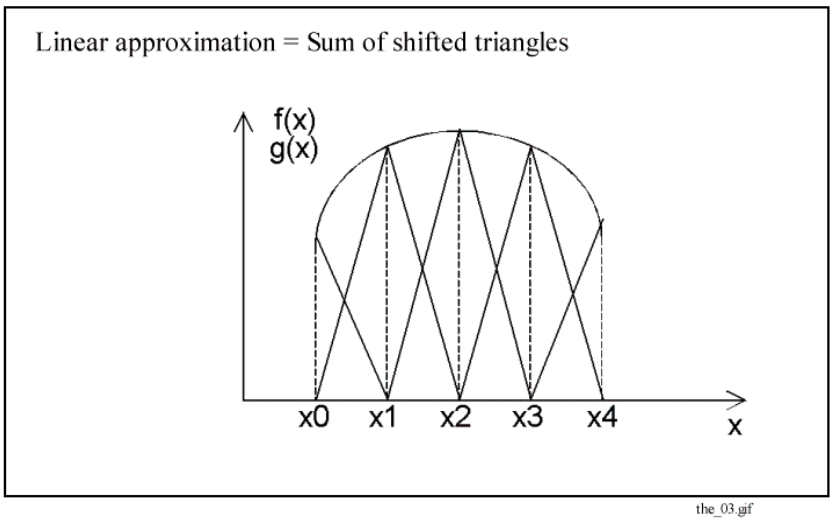
Current Modeling

Basis functions: concept of numerical solutions



The function f(x) is the original function

The function g(x) is a linear approximation of f(x)



An alternative description is to have f(x) be the sum of two shifted triangular functions.