This book, the *Mixed-signal Methodology Guide: Advanced Methodology for AMS IP and SoC Design, Verification, and Implementation* provides a broad overview of the design, verification and implementation methodologies required for today’s mixed-signal designs. The book covers mixed-signal design trends and challenges, abstraction of analog using behavioral models, assertion-based metric-driven verification methodology applied on analog and mixed-signal and verification of low power intent in mixed-signal design. It also describes methodologies for physical implementation in the context of concurrent mixed-signal design and for handling advanced node physical effects. The book contains many practical examples of models and techniques. The authors believe it should serve as a reference to many analog, digital and mixed-signal designers, verification, physical implementation engineers and managers in their pursuit of information for a better methodology required to address the challenges of modern mixed-signal design.

**Chapter listing**

1. Mixed-Signal Design Trends and Challenges
2. Overview of Mixed-Signal Design Methodologies
3. AMS Behavioral Modeling – the chapter being provided
4. Mixed-Signal Verification Methodology
5. A Practical Methodology for Verifying RF Designs
6. Event-Driven Time-Domain Behavioral Modeling of Phase-Locked Loops
7. Verifying Digitally-Assisted Analog Designs
8. Mixed Signal Physical Implementation Methodology
Chapter 11 was written by Cliosoft and looks at today’s mixed-signal design environment and outlines traditional team design techniques and pitfalls as well as the general requirements for a data management system. It explains how to manage projects with a data management system, how such a system impacts collaboration across globally distributed design centers, and how team design can leverage a data management system for more efficient workflow, to manage engineering change orders, to track releases and variants, and to more effectively reuse IP and process design kits (PDKs) across projects. Examples of rules, roles, access and permissions flesh out methodologies for deployment productivity gains. You can get a copy of that chapter from here.

http://www.cliosoft.com/msmguide/

I spoke with Ron Vogelsong, the author of chapter 3, the chapter that I will be excerpting here. *Can you tell me about your involvement with this book project?*

Mladen Nizic was the real driver for the project and I was called in part way through when they wanted a chapter on modeling. That is what I have been working on ever since I got to Cadence in 2001 and a better part of 10 years before that, so it is a subject that I am very familiar with. The discussion quickly got to one of – do we want to do a big section on modeling or just a little one. At first we were just going to do a small segment but quickly realized that it should be a chapter and then I personally had the problem of how do I not write a book given that there is such a breadth of things that could be covered. There are many different ways to do mixed-signal modeling and in this chapter I cover the analog side, the mixed-signal side, the digital side and the “real” side. It was interesting putting together that much information in one place.

*How has the problem changed in the time you have been working in it?*

There has been quite a progression in modeling during the time I have been involved with it. Initially it was just analog and the digital stuff went along independently. When we got a mixed-signal environment with Verilog AMS, which really pulled it together, our customers realized that creating these models was very complicated. There is so much you can do, and so many different ways to do things and you need to have skills in both analog and digital and do both well. It was very difficult to get things working. In the last few years with real modeling, I have started to see a lot more traction with customers for the simple reason that when you get into the real mode you are getting rid of a lot of the tricky things that you can do in analog and forcing people to concentrate on what is the transfer function between inputs and outputs. Can you describe that? A lot of people are realizing that this is the right level to describe how things operate. So I really think this is the direction in which is everything is moving to.

*Is this the first time you have taken on a project of this size?*

In my first year at Cadence I put together an extensive AMS training course that I have been giving ever since. It is two days’ worth of materials and so it was quite an effort to compile all of that. But this is the first time that it resulted in something for publication.

*How supportive was Cadence for this effort?*

Cadence had already been pushing me to get more information into the hands of customers so when this book project came along, it was already something that I had sort of been tasked to do, so it was a very good fit with my schedule and priorities. I have enjoyed doing it. It was a lot of fun and it gave
me the time to stand back and ask – what really needs to be there and how can we focus on the important parts?

*So, is the next step a whole book on modeling?*

That is a good question. I have been wondering about that but the amount of time it would take to write a whole book still scares me. However I do think it would be very useful.

Chapter 3 **AMS Behavioral Modeling**

Available in this segment are:

- **Overview**
- **Modeling Classifications**
- **Types of Modeling**

Coming shortly:
- Basic Modeling Formats
- Additional Model Coding Examples
- Modeling Best Practices Considerations
- Summary
- References

The book is available [here](#).

**Other recent book excerpts:**

- [Introduction to Open Core Protocol](#)
- [Signal and power integrity – simplified (second edition)](#)
- [Power integrity for I/O interfaces: with signal integrity/power integrity co-design](#)
- [Power Integrity Analysis and Management for Integrated Circuits Part 2](#)

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