



IEEE DASC P1076.1 Working Group

<http://www.eda.org/vhdl-ams/>

Working Group Meeting March 9, 2010 co-located with DATE 2010

Ernst Christen
WG Chair

christen.1858@verizon.net

Administrative Issues

- ◆ Approval of minutes of WG meeting held February 9, 2010
- ◆ Review of IEEE patent policy
 - <http://standards.ieee.org/board/pat/pat-slideset.pdf>



Agenda

- ◆ Call to order
- ◆ Approval of agenda
- ◆ Administrative issues
 - Minutes of last meeting
 - Review of IEEE patent policy
- ◆ IEEE-SA Update
- ◆ Survey results
- ◆ IEEE P1076.1 PAR
- ◆ Next steps
- ◆ AOB
- ◆ Adjourn



WG Updates

- ◆ Publicity
 - Looked at possibilities to include CFP in IEEE D&T, Automotive Engineering, EE Times
 - No results yet
- ◆ 1076.1.1 revision
 - No progress



IEEE-SA Update (1)

◆ Entity membership

- IEEE restructured its entity membership program
 - Revenue based membership fees
- Affects entity-based Working Groups
 - Entities that are Advanced SA members have voting rights and may make motions
 - Entities that are Basic SA members are only observers, but can attend any number of meetings
 - Non-entity members may attend a WG meeting only once
- Does not affect P1076.1 WG, which is based on individual participation



VHDL-AMS Survey: Overview

◆ Purpose

- Raise interest and recruit new active participants
- Prioritization of voluntary projects
- Recommendations for additional projects

◆ Methodology

- Questionnaire sent to different mailing lists
 - vhdl-ams@eda.org, stds-dasc@eda.org
 - SAE
 - VDA
 - ECSI
- Survey started January 18, 2010
- Survey ended February 20, 2010

◆ 19 responses



IEEE-SA Update (2)

◆ Obligations for Participation (effective March 31)

- Committee Participation
 - Consensus building, no domination
 - Affiliation must be disclosed
- Rules of Engagement
 - Bound by all IEEE Policies and Procedures, including updates
- Conflicts of Interest must be disclosed
- IEEE Code of Ethics must be followed
- IEEE-SA members must agree to these obligations

◆ Updated Copyright Policy (effective March 31)

- IEEE owns Copyright on all Work Products
- Use of Previously Published material requires Copyright Permission
- For use of unpublished material, IEEE has non-exclusive rights to use material in connection with the standard to it was contributed
- WG chair is responsible for identifying Previously Published material in PAR and for obtaining Copyright Permission



VHDL-AMS Survey: Participants

1. Alin Constantin Mocanu, Infineon
2. Alan Mantooh, University of Arkansas
3. Rashed Rabaa, GM
4. Colin Marquardt, ZMDI
5. David Smith, Synopsys
6. Zhichao Deng, Synopsys
7. Gilles Depeyrot, Dolphin
8. Lars Vosskaemper, Dolphin
9. Gary Dare, Ripco
10. Daniel Cheok Kiang Kho, Altera
11. Ernst Christen, Lynguent
12. Lili Zhou, Orora
13. Ewald Hessel, Hella
14. Alain Vachoux, EPFL
15. Torsten Mähne, EPFL
16. Sameer Kher, Ansoft
17. Uwe Eichler, Fraunhofer
18. Joachim Haase, Fraunhofer
19. Markus Pistauer, CISC Semiconductor



VHDL-AMS Survey: Results

	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Mixed netlists	126	10	6	7	9	8	3	7	1	9	8	9	7	3	10	10	3		8	8
Freq. domain modeling	136	1	9	5	6	5	9	9	9	10	10	6	9	10	8	8	5		7	10
PDE Support	114	5	5	6	6	3	10	6	10	5	10	3	8	8	5	5	9		3	7
Table-driven modeling	138	5	10	9	2	10	7	5	6	6	2	10	10	10	9	9	5	7	6	10
Vector/matrix operations	124	5	8	8	2	7	10	8	5	4	10	6	10	7	8	10	4		3	9
Unified use of SPICE models	115	10	7	10	2	5	8	9	8	8	3	6	5	8	7	6	2		10	1



VHDL-AMS Survey: Comments (2)

◆ Frequency-domain modeling

- Ewald Hessel
 - Just as important as table-driven modeling: EMC applications where measured frequency domain data is available
 - Proposal by Joachim Haase presented at FDL'09
- Torsten Mähne
 - Extension is needed to support non-linear behavior in frequency domain: harmonic balance support
 - Base band modeling (see later)



VHDL-AMS Survey: Comments (1)

◆ Mixed netlists

- Torsten Mähne
 - Very important topic, required for various use cases:
 - Top level simulation of system where components are replaced with more detailed models
 - Pin-accurate models with different ports of different types
 - Not desirable to have to change structural description
 - Non-standard solutions exist, in particular VHDL/SPICE coupling



VHDL-AMS Survey: Comments (3)

◆ PDEs

- Ewald Hessel
 - Important for modeling of interconnect in automotive systems
- Torsten Mähne
 - Not sure the proposal is broad enough: only simple geometries
 - Partial derivatives availability often useful. Provided 2 examples
 - Application areas: MEMS devices, structural mechanics, EMC problems, thermal conductivity
 - Many problems in this area are Reduced Order Model issues



VHDL-AMS Survey: Comments (4)

◆ Table-driven modeling

- Ewald Hessel
 - Important to work with measured data, e.g. drive cycle data
 - Simple package used by AK30, written by Joachim Haase, allowing reading/writing ASCII files
- Torsten Mähne
 - Very useful when working with measured data and for reduced-order modeling
- Uwe Eichler
 - Has used tlu model in fundamentals_vda library
 - Concerned about performance if table has to be passed to function in each call



VHDL-AMS Survey: Comments (6)

◆ Uniform use of SPICE models

- Ewald Hessel
 - AK30 works with spice2vhdl library
 - Reliable, although not very fast
 - Tool vendors were asked to provide VHDL-AMS access to their built-in SPICE models for improved performance, with little success
 - Problems arise when built-in models have different parameters than Spice 3F5
 - SPICE netlist support in VHDL-AMS not necessary
- Torsten Mähne
 - Not sure how important instantiation of SPICE models is
 - More important may be instantiation of SPICE subcircuits



VHDL-AMS Survey: Comments (5)

◆ Vector/matrix operations

- Ewald Hessel
 - Concern is that tools often have limited support for composites, and transformations to vectors are necessary
- Torsten Mähne
 - Would be useful to support
 - Modeling mechanical systems
 - Compact expression of state space equation systems



VHDL-AMS Survey: New Projects

◆ RF, Base band modeling (Torsten Mähne)

- Steady-state frequency response of RF systems including mixers and other nonlinear components
- Papers describe unsuccessful attempts to do base band modeling in VHDL-AMS and Verilog-AMS
 - Need complex data types for quantities
- Several simulation scenarios to support, all in time domain and containing different implementations of the RF components

◆ More flexible 'LTF, 'ZTF (Torsten Mähne)

- Non-static coefficients, changes announced by break
- Also support pole/zero forms and combinations, as in Verilog-AMS

◆ Miscellaneous (Ernst Christen)

- Periodicity and integration
- Non-static ideal delay
- Calls to impure functions in characteristic expressions
- Functionality similar to postponed process for analog solution



VHDL-AMS Survey: Conclusions

- ◆ **Emphasis should be given to projects in the following order**
 - Table-driven modeling
 - Frequency domain modeling
 - Mixed netlists
 - Vector/matrix operations
 - Unified use of SPICE models
 - Support for PDEs
- ◆ **Additional functionality to be defined**
 - Definitions for other forms of 'LTF and 'ZTF (pole/zero)
 - Periodicity and integration
- ◆ **Small projects to be investigated for this revision:**
 - Non-static coefficients for 'LTF, 'ZTF: physical meaning, algorithms
 - Non-static ideal delay: physical meaning, algorithms
 - Impure functions in characteristic expressions: cost of implementation
 - Postponed for analog: restrictions
- ◆ **Postponed to a later revision**
 - RF, Base band modeling



Offers to Participate in WG Work

- ◆ **Ewald Hessel, on behalf of AK30**
 - Creation and testing of packages
 - Reviewing requirements
- ◆ **Sameer Kher, Ansoft**
 - General offer to participate



1076.1 PAR

- ◆ **Draft PAR for P1076.1**



Next Steps

- ◆ **Publicity**
 - Further probing
- ◆ **1076.1.1 revision**
 - WG review by March 20
 - WG approval by next meeting
 - Start balloting group ASAP
- ◆ **1076.1 revision**
 - Complete PAR draft
 - PAR approval by WG
- ◆ **Meeting schedule**
 - Meeting schedule once per month
 - Web meetings most of the time
 - Always announced at www.eda.org/vhdl-ams
 - Next meetings:
 - Tuesday, April 13, 2010, 8am PST (tentative)

