
Workshop on Compact Models – Anaheim, May 10-12, 2005

panel discussion

”model diversity” vs. ”model standard”

Prof. Matthias Bucher

bucher@electronics.tuc.gr

Technical University of Crete (TUC)



I. Surface potential or charge model

❖ Model developer:

- ✓ Not THE issue: there is a lot of “permeability” among the two. Take whatever is more convenient.

❖ Model user:

- ✓ Need an accurate, fast, reliable, predictive, available model that also supports *DESIGN*.
- ✓ Surface potential is *NOT* a design variable...
- ✓ ... inversion charge *IS* – it’s directly linked to ID, gm, etc.

II. How many models?

❖ Model developer:

- ✓ Depends on technology:
 - no single model can address bulk, SOI (FD, PD), DG, FinFET, LDMOS,
- ✓ Depends on focus: digital, analog-RF, ...

❖ Model user:

- ✓ User demands vary tremendously.
- ✓ May need two types of models:
 - Easy-to-use, rough, “hand-calculation” model, with limited accuracy but high efficiency
 - High-accuracy, “full-feature”

III. Support issues?

❖ Model developer:

- ✓ Model development on 'standard' platform – Verilog-A
- ✓ Code synthesizers e.g. Verilog-A → C favor standardization of code in different simulators
- ✓ Need privileged relationship/interaction with CAD vendors.
- ✓ Parameter extraction toolkits.

❖ Model user:

- ✓ Foundries may support one, maybe two models depending on their customers

IV. User-model developer interaction

❖ Organize modeling tutorials, workshops (1-2 days)

- ✓ EKV model users' group meeting & EKV3.0 model workshop
EPFL, Lausanne, Switzerland, November 4-5, 2004
 - >50 attendees
 - <http://legwww.epfl.ch/ekv/workshop>

V. Academia → Industry

- ❖ Model code tested, validated, “fool-proof”
- ❖ Verilog-A code
- ❖ Documentation, test cases, extraction method
- ❖ Need appropriate forum for user-developer interaction

VI. Model standard – standard model

❖ NEED true “model standard”!!

- ✓ NOT (one or two) “standard” models – monopoly situation kills innovation.
- ✓ Modeling needs are too broad & diversified to be covered by one single model
- ✓ Rapid evolution of technology – in contradiction to the idea of a “standard model”

...more considerations on model development

- ❖ Models are mainly developed at universities
 - ✓ educating designers & young engineers
is/remains/should be! the main focus of universities
 - ✓ Still a huge gap in analog design education – bridging device physics and circuits

- ❖ Funding situation for universities remains problematic
 - ✓ Need more dedicated infrastructure for industry support, research funding opportunities.