panel discussion

”model diversity” vs. “model standard”

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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](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.