

EKV workshop 2004

New Capabilities for the Verilog-A EKV Model

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Overview

- Verilog-A provides a simple, efficient language of describing analog behavior in simulators
- End users will only accept Verilog-A if models look and feel like “built-in” devices with support of all analyses and comparable performance
- This work demonstrates complex compact device models, including the EKV, implemented in Verilog-A working in proprietary and commercial simulators

Compact Model Development

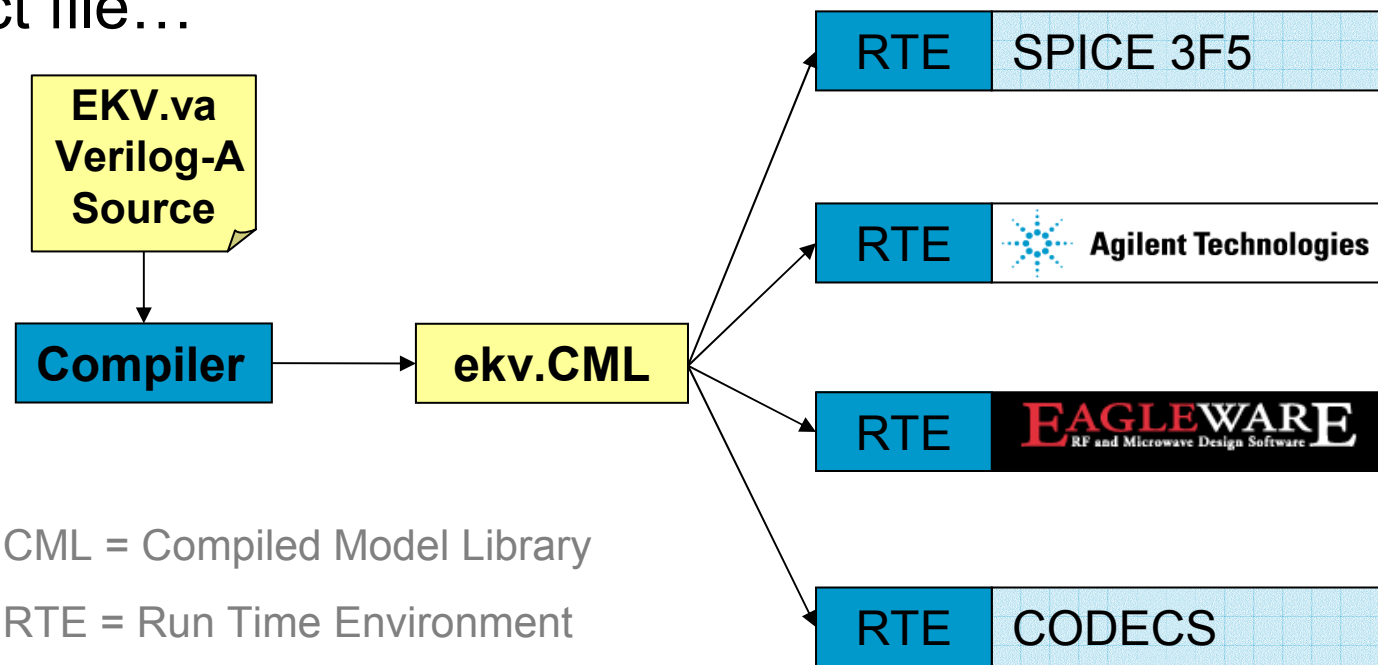
- Current development process has become very cumbersome
- Result is a huge lag in time and practical gap between model developers and end users
- The few models that are supported try to handle everything
- Models like the EKV have to create customer “pull” to get simulator vendors to implement the model
 - but customers won’t evaluate the model if it’s not available in the simulate.

Benefits of Verilog-A

- Immediate release and updates of models to end users
- Models can be tested on real circuits during the development phase
- Fewer coding errors since derivatives and analysis loads are generated automatically
- Verilog-A is readable and the model becomes self-documenting
- Models can be archived for future use – much simpler version control
- Models are portable
- Automatic range checking

Tiburon Verilog-A Architecture

The compiler produces a independent, portable model object file...



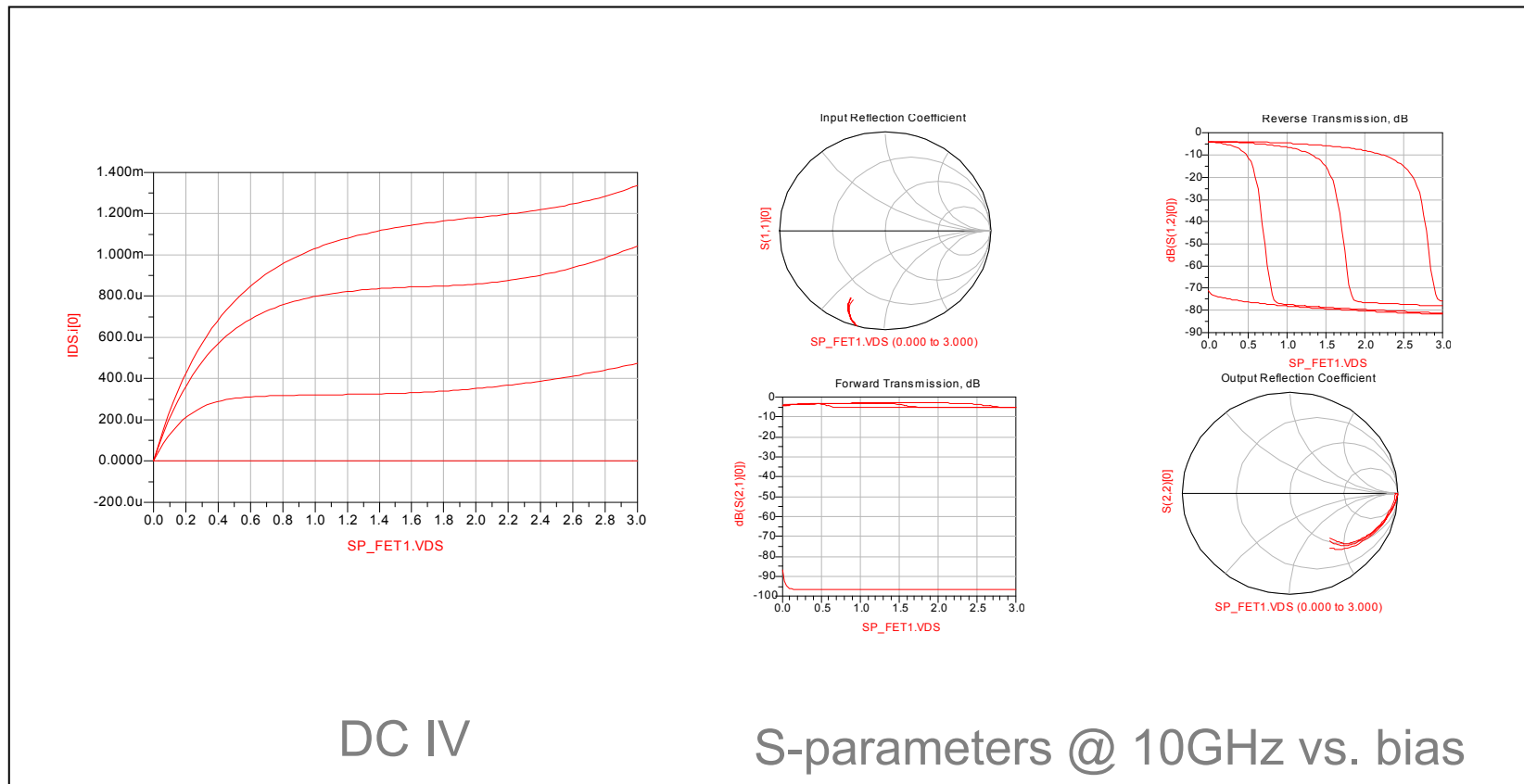
CML = Compiled Model Library

RTE = Run Time Environment

...which can be shared by multiple simulator types

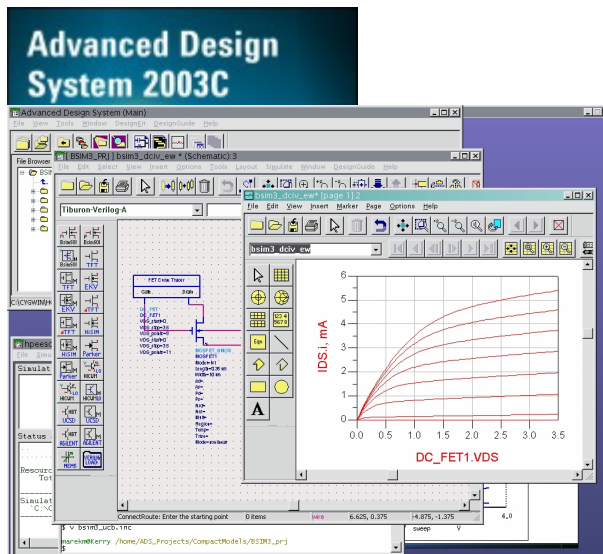
EKV Support in ADS

- Verilog-A devices must be supported in all analysis types, just like built-in devices

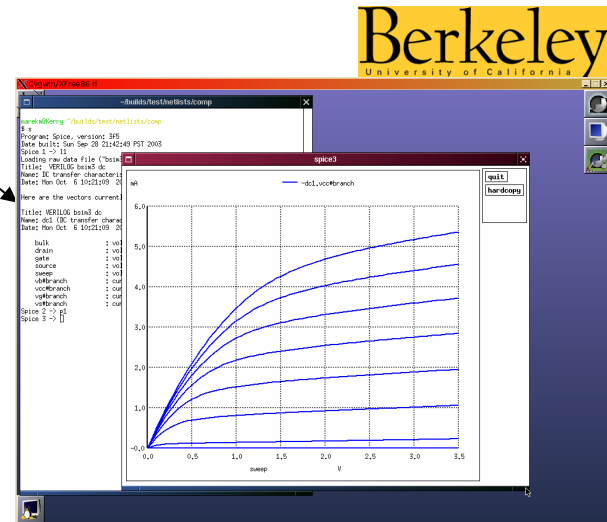
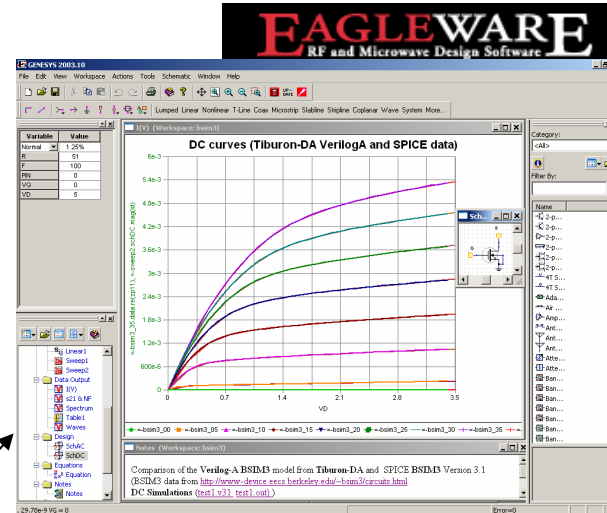


Multiple Simulators Sharing One Model

- Compiled Verilog-A devices can be shared among diverse simulators
- Same compiled object file linked to each simulator
- Develop in one simulator, same results in all simulators



BSIM3.cml



Summary

- Verilog-A has been shown to be an ideal language for describing analog behavior, including implementation of compact device models
- Verilog-A provides a way to distribute identical model content in a variety of commercial and research simulators
- Models such as the EKV can be developed with less effort and distributed to commercial simulators with no loss of functionality