

Research Article

Qucs: A GPL software package for circuit simulation, compact device modelling and circuit macromodelling from DC to RF and beyond

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First published: 05 September 2008 | <https://doi.org/10.1002/jnm.702> | Cited by: 19

Qucs Project Manager

<http://qucs.sourceforge.net>

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Abstract

The 'Quite universal circuit simulator' (Qucs) is an open source circuit simulator supporting Verilog-A compact model standardization. This paper describes a number of compact semiconductor device and circuit macromodelling techniques that have been implemented in recent Qucs releases, stressing those techniques that are not found in SPICE 2g6 or 3f5. It also introduces a novel hierarchical approach to Verilog-A compact model and circuit macromodel construction based on non-linear equation-defined devices, linear-controlled sources and noise generators embedded in subcircuits. To illustrate the new approach, the properties and models of a number of components with electrical and non-electrical characteristics are described. These models demonstrate how recent trends in open source simulation technology use embedded equations as integral elements in component and physical process models. Copyright © 2008 John Wiley & Sons, Ltd.