ECE 521 Fall 2006

Analog Circuit Simulation

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Web page:	http://www.ece.orst.edu/~karti/ece521.html
Course Objective:	Learn the theoretical and practical aspects of building a circuit simulator such as SPICE and be exposed to the current state of the art and the future challenges.
Prerequisites:	A background in circuit theory, ability to write software in (C, C++, or Fortran), and an appreciation for numerical methods
Grading:	Homework (4-5 assignments) 35% (Part 1 - 10%; Part 2 - 30%) Exam 30% Final Project 30%
Cheating Policy:	You may work together on homeworks but not copy someone else's work. **Cheating is unacceptable**.
TextBook:	Lecture notes.
References:	J. Vlach and K. Singhal, *Computer Methods for Circuit Analysis and Design*, Van Nostrand Reinhold Co, 1994. A. Nardi, *EE219A Class Notes*, Univ. of California, Berkeley, 2002. http://www.eecs.berkeley.edu/~nardi/EE219A W. J. McCalla, *Fundamentals of Computer-Aided Circuit Simulation*, Kluwer Academic Publishers, 1988. L. T. Pillage, C. Visweswaraiah, and R. A. Rohrer, *Electronic Circuit and System Simulation Methods*, McGraw Hill, 1995. L. O. Chua and P. M. Lin, *Computer-aided Analysis of Electronic Circuits*, Prentice-Hall, 1975. K. S. Kundert, J. K. White, and A. Sangiovanni-Vincentelli, *Steady-State Methods for Simulating Analog and Microwave Circuits*, Kluwer Academic Publishers, 1990.

Course Outline

(1 week)	Formulation of Circuit Equations: Nodal Analysis, Modified Nodal Analysis (MNA), and Sparse Tableau Approach (STA)
(1 week)	Solution of linear equations: Direct and iterative methods, Sparse-matrix techniques
(1 week)	DC analysis: Solution of nonlinear equations and convergence issues
(3 weeks)	Small-signal ac, transient, and Fourier analyses. Anatomy of a circuit simulator
(1 week)	Sensitivity and noise analyses
(1 week)	Pole/zero analysis and moment matching methods
(2 weeks)	Latest advances and analysis methods for RF circuits

9. COURSE ETHICS

Students are expected to uphold high ethical standards including adherence to Oregon State University Academic Regulations and Student Regulations. Also see http://eecs.oregonstate.edu/graduate/cs/dishonesty.html

You are permitted and to a great extent encouraged to seek the advice of others. However, any help/advice you receive must be fully documented so that you do not falsely represent yourself and your work. This course requires that ALL material submitted for grade contain complete documentation including a "References" section appended to the end of each submission. The following table lists some examples of how to properly document your work.

Using only the course text book, you complete a homework set.	References: None
You work with a group to complete a homework set.	References: I worked concurrently with Joe Smith, Karen Peavy, and John Shu on this homework set as part of a study group.
You are stuck on how to draw the free body diagram for one of the problems in a homework set and ask John Smith how he approached the problem.	References: John Smith explained how to set up the free body diagram on problem 1.
You cannot get your computer program to properly simulate a system and you look at Sally Yam's working computer code.	References: I looked at Sally Yam's properly working computer code to try to figure out what I was doing wrong.

Note that none of the examples listed above would results in a loss of points to the student.

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4. Uncredited improper paraphrasing of pages or paragraphs (by changing a few words or phrases or rearranging the original sentence order). Calls for a written apology to avoid suspension of publication privileges and a possible violation notice in the later article's bibliographic record.

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The guidelines also make recommendations for dealing with repeated offenses.

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