

ELEC4506

Computer-Aided Circuit Design

The course covers the basic principles and algorithms of circuit simulation and is intended for developers/users of CAD tools and circuit/system designers. The application of the simulation algorithms spans a wide spectrum of engineering fields.

Course Outline

Frequency-Domain:

- *Modified-Nodal Analysis*
- *LU decomposition*
- *Sparse techniques*
- *Sensitivity Analysis*

Linear Time-Domain:

- *Multi-step methods*
- *Numerical stability*
- *Time-domain Sensitivity Analysis*

DC Solution of Nonlinear Circuits

- *Jacobian matrix,*
- *Newton's iterations*
- *Convergence and accuracy issues*

Nonlinear Time-Domain

- *Charge-based formulation of the circuit equations*
- *Iterative time-stepping solution*

Sensitivity Analysis

REFERENCES

- (1) *Computer Methods for Circuit Analysis & Design*
J. Vlach and K. Singhal, Van Nostrand Reinhold 1983/ 1994
- (2) *Circuit Simulation*
F. Najm, Wiley, 2010.

+Handouts

Additional Reading Material

- (1) *Electronic Circuit and Simulation Methods*
L. Pillage, R. Rohrer, C. Visweswariah, McGraw-Hill 1995

Instructor:

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Teaching Assistants:

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(2) Introduction to MATLAB for Engineers and Scientists (or equivalent)
Delores M. Etter, Prentice Hall 1996

Course Grading

50% Final Exam (*open book-eProctoring*)
25% Midterm Exams (*open book- eProctoring*)
25% Labs and Assignments

Passing the final exam is necessary condition for passing the course

Equity Services Accommodation:

<http://www.carleton.ca/equity/accommodation/outlines.htm>