

Preconditioners for problems arising in circuit simulation

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May 26, 2015

Abstract

Linear systems arise in several circuit simulation problems, for instance in the inner iterations of Newton's method for solving nonlinear systems of equations. Because the properties (symmetry, definiteness, real/complex, ...) and sizes may vary with the circuit and the type of simulation, a recurring dilemma is the choice between direct and iterative solvers. In case one chooses an iterative solver, apart from which solver one also has to choose a suitable preconditioner. In this presentation we will introduce various kinds of circuit simulation/analysis and their corresponding linear systems. By means of these usecases we will give an impression of the requirements that solvers and preconditioners have to satisfy. Additionally, preconditioning techniques that are popular in the industry will be discussed, with the aim to have feedback from experts in the audience.