

## Generation Program of State Equations

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*Abstract*— An analog circuit analysis method in the time domain, based on the state equation procedure, is presented. This method automatically formulates the state equations in a symbolic normal-form, for large time-invariant analog circuits. Starting from the circuit description in the netlist form, this method is based on Kirchhoff's laws, constitutive equations of the circuit elements, and it uses the facilities of symbolic simulator Maple. Using the state equations in the operational form the circuit functions in full symbolic, partly symbolic or numeric form are generated. In this paper is described one very efficient algorithm that generates the state equations in normal full symbolic form. This algorithm was implemented in a program – called SYSEG - SYmbolic State Equation Generation. This program allows the formulation of symbolic state equations without any inverse of a symbolic matrix, and, by cancellation and simplification of the expressions; it obtains a symbolic compact form. SYSEG also allows the schematic representation, the analysis and design of linear or nonlinear analog circuits, even when they have excess elements. A user guide in English version for SYSEG program is presented. Also an illustrative example is given to prove that SYmbolic State Equation Generation program is a very useful tool for symbolic analysis and design of linear and/or nonlinear time-invariant analog circuits. This example proves that SYSEG program can be used also for the circuits with excess elements.