PACKAGE ID - 000823MLTPL00 PGP SOLVER

KWIC TITLE - Solver for Power and Ground Plane Parasitic Inductance Mesh

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LIMITATION CODE -COPY **AUDIENCE CODE -** LIM

COMPLETION DATE - 02/01/1995 **PUBLICATION DATE -** 02/01/1995

DESCRIPTION - Printed Circuit Boards, Multichip Modules and other such electronic assemblies typically have two or more conductive interconnect layers or planes separated by some dielectric medium for the purpose of routing connections to power and ground pins respectively. The electrical parasitics, inherent in and between the planes, can be significant. To model these effects, the planes can be represented by a complex mesh of coupled inductive and resistive elements. This allows one to calculate the complex impedence of these parasitic elements so that power and ground pins and associated routing could be optimally positioned. OEA International Inc. has developed software which by spatial analysis using finite-differences techniques produces a large netlist of these parasitic elements. Traditional circuit analysis tools such as SPICE circuit simulators are prohibitively slow in analyzing the netlist. PGP-Solver is a practical alternative, producing an analytical solution for the mesh of complex impedences represented in the netlist, in an order of magnitude less computing time.

PACKAGE CONTENTS - Media Directory; Software Abstract; PGP SOLVER Man Pages; Media Includes Source Code;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 3.5 Diskette

METHOD OF SOLUTION - The solution method is based on solving systems of complex linear equations. The essence of PGP-solver is the efficient application-specific formulation of the system of equations according to Kirchoff's Loop Theorem. Spanning Tree other Graph Theory methods are used to identify and create the loops and hence the equations. For the numerical solution of such a system of equations, several packages are available; we use the Sparse matrix package from UC Berkeley which is based in LU matrix decomposition.

COMPUTER - MLT-PLTFM

OPERATING SYSTEMS - PGP-Solver can be run on any UNIX machine, though it has been compiled and tested only on a 9000/HP700 workstation.

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PROGRAMMING LANGUAGES - C

SOFTWARE LIMITATIONS - There are no specific technical software limitations. Memory is dynamically allocated with no program-set bounds.

SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - It provides a practical alternative to SPICE by being an order of magnitude faster for the problem is question. It uses a public-domain matrix solver. It makes OEA's Henry/PGP product saleable by providing an enabling back-end analytical engine.

RELATED SOFTWARE - OEA Henry/PGP and UCB Sparse matrix package

HARDWARE REQS - No specific requirements other than a high-performance UNIX workstation.

TIME REQUIREMENTS - It takes about 1 hour to solve for all complex currents in all branches of a 400 element mesh consisting of 2000 inductors, 2000 resistors and 34,000 mutual inductors.

REFERENCES - Informal documentation

ABSTRACT STATUS - Submitted 5/8/95. Released AS-IS 7/7/95.

SUBJECT CLASS CODE - T

KEYWORDS -
COMPUTER PROGRAM DOCUMENTATION
P CODES
PRINTED CIRCUITS
LAYERS
INDUCTION
ELECTRIC GROUNDS
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EDB SUBJECT CATEGORIES -
990200 426000

SPONSOR - DOE/ER

PACKAGE TYPE - AS - IS