NASA TECH BRIEF

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Digital Computer Technique for Setup and Checkout of Analog Computer

The problem:

To eliminate the costly verification, setup, and checkout efforts of analog computer programmers and to assure that a given problem (a mathematical model) is correctly implemented on an analog computer. The present method uses desk calculator techniques for calculation of potentiometer settings, and static check values, and is very susceptible to human error.

The solution:

Use a new computer program technique, called Analog Computer Check-Out Routine Digitally (ACCORD), which generates complete setup and checkout data for an analog computer. In addition, the correctness of the analog program implementation is validated.

How it's done:

A technique of two distinctly different Digital Simulation Language (DSL/90) program methods is used to cross check the analog computer program's correctness before placing the problem on the analog computer. The two DSL/90 program methods used are:

1. Macro and Fortran statements using the DSL/90 program.
2. Analog program implementation using standard DSL/90 building blocks which represent their analog counterparts.

Results of the first method are checked and compared with results obtained from the second method. If these results are in accord, then it is assumed both methods are implemented correctly. In addition, it is also assumed that the calculated potentiometer settings, static check values, and the dynamic responses generated in the second method are correct and are ready to be used to set up and check out the analog computer program.

ACCORD also provides a method of validating the analog program implementation by generating the following information:

1. Potentiometer setting calculation
2. Complete static check of the analog program
3. Complete set of plots for the dynamic check of the analog program
4. Potentially overloaded amplifiers in the analog program prior to placing the problem on the analog computer
5. Tape for automatic potentiometer setting, automatic static checking, and automatic dynamic checking of the analog computer.

Notes:

1. ACCORD is applicable to most conventional digital and analog computer systems. It permits the user to concentrate upon the phenomenon being simulated rather than the mechanism for implementing the simulation.
2. Documentation for the innovation is available from:

   Clearinghouse for Federal Scientific and Technical Information
   Springfield, Virginia 22151
   Price $3.00
   Reference: B68-10576

Patent status:

No patent action is contemplated by NASA.

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