



Technology Opportunity



JPL's

Method for Evolving Analog Circuits

A high-speed, intrinsic evolutionary technique for analog circuits controlled in response to chromosome patterns

Marketing Summary

When a design specifies the entire circuit, the necessary hardware elements are simply connected as appropriate to create the specified circuit. When the design specifies only some of the circuit or its behavior, however, circuit synthesis is less straightforward. In these cases, the ability to evolve hardware to create new circuit designs from limited specifications is essential. While existing evolutionary techniques and reprogrammable hardware are well-suited for creating digital circuits, they are not practical for creating analog circuits. Innovators at JPL have developed a method for evolving analog circuits to address this need.

Technology

A programmable transistor array (PTA) can be made with eight complimentary transistors interconnected by programmable switches. This forms a reconfigurable building block based on elements of the lowest level of granularity, and higher-level building blocks can thus be implemented via programming constraints, as dictated by the specific task. Combinations of PTA modules and other reconfigurable building blocks can be intrinsically evolved by selecting the status of each switch in response to a chromosomal pattern. Evolution using gradual switches allows for a trade space between evaluation time and sensitivity to transistor-dependent variations.

Benefits

- Fast hardware evolution
- Versatile building block
- Electronics can self-adapt to changing environments

Applications

- Design automation
- Semiconductor industry
- Consumer electronics

Technology Status

- Patent Pending
- U.S. Patent (US 6,526,556)
- Copyrighted
- Available to license
- Available for no-cost transfer
- Seeking industry partner for further co-development

If your company is interested in licensing or joint development opportunities associated with this technology, or if you would like additional information on partnering with NASA, please contact:

Jet Propulsion Laboratory

Mark W. Homer, Patent Counsel
 NASA Management Office
 4800 Oak Grove Drive M/S 180-200
 Pasadena, CA 91109
 (818) 354-7770
<https://scienceandtechnology.jpl.nasa.gov>