

Scientific FORTH: a modern language for scientific computing

FORTH has been called "...one of the best-kept secrets in the computing world." Combining the execution speed of a compiled language with the immediacy and convenience of an interpreted language, FORTH is nevertheless so simple its kernel can be compressed into a few kilobytes of machine code. Many scientists, engineers and programmers have recognized that FORTH provides the "most direct, revealing and flexible way for controlling computer hardware yet invented," applying FORTH to industrial control, robotics and laboratory instrumentation.

FORTH is the only completely extensible modern computer language. User-defined operators, data structures, commands, functions and subprograms act precisely like the core operators, data structures and commands—they are true extensions to FORTH. Moreover, the FORTH compiler is part of the language, available to the user. These features give FORTH enormous abstractive power and elegance of expression. Thus, a FORTH program to solve linear equations can look as simple as

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:}}SOLVE ( adr[M] adr[y] -- ) SETUP TRIANGULARIZE BACKSOLVE ;
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Scientific FORTH extends the FORTH kernel in the direction of scientific problem-solving. It is the first book to illustrate advanced FORTH programming techniques with non-trivial applications:

- high-speed real and complex floating point arithmetic
- numerical integration/Monte-Carlo methods
- linear equations and matrices
- functional representation of data (FFT, polynomials)
- function minimization
- differential equations
- roots of equations
- computer algebra

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