

# David E Keyes

## List of Publications by Year in descending order

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150  
papers

3,198  
citations

304368

22  
h-index

182168

51  
g-index

156  
all docs

156  
docs citations

156  
times ranked

2110  
citing authors

#	ARTICLE	IF	CITATIONS
1	A scheduling policy to save 10% of communication time in parallel fast Fourier transform. <i>Concurrency Computation Practice and Experience</i> , 2023, 35, e6508.	1.4	2
2	Accelerating Geostatistical Modeling and Prediction With Mixed-Precision Computations: A High-Productivity Approach With PARSEC. <i>IEEE Transactions on Parallel and Distributed Systems</i> , 2022, 33, 964-976.	4.0	14
3	<b>Computing High-Dimensional Multivariate Normal and Student-t Probabilities with Low-Rank Methods in R</b> . <i>Journal of Statistical Software</i> , 2022, 101, .	1.8	1
4	Nonuniform 3D finite-difference elastic wave simulation on staggered grids. <i>Geophysics</i> , 2022, 87, T347-T361.	1.4	3
5	Space-Fractional Diffusion with Variable Order and Diffusivity: Discretization and Direct Solution Strategies. <i>Communications on Applied Mathematics and Computation</i> , 2022, 4, 1416-1440.	0.7	3
6	High-performance 3D Unstructured Mesh Deformation Using Rank Structured Matrix Computations. <i>ACM Transactions on Parallel Computing</i> , 2022, 9, 1-23.	1.2	2
7	H2Opus: a distributed-memory multi-GPU software package for non-local operators. <i>Advances in Computational Mathematics</i> , 2022, 48, 1.	0.8	2
8	Performance analysis of relaxation Runge-Kutta methods. <i>International Journal of High Performance Computing Applications</i> , 2022, 36, 524-542.	2.4	2
9	A Nonlinear Elimination Preconditioned Inexact Newton Algorithm. <i>SIAM Journal of Scientific Computing</i> , 2022, 44, A1579-A1605.	1.3	2
10	Parallel Approximations of the Tukey g-and-h Likelihoods and Predictions for Non-Gaussian Geostatistics. , 2022, , .		0
11	A Framework to Exploit Data Sparsity in Tile Low-Rank Cholesky Factorization. , 2022, , .		5
12	Parallel space-time likelihood optimization for air pollution prediction on large-scale systems. , 2022, , .		4
13	On the robustness and performance of entropy stable collocated discontinuous Galerkin methods. <i>Journal of Computational Physics</i> , 2021, 426, 109891.	1.9	19
14	Simulation of Turbulent Flows Using a Fully Discrete Explicit hp-nonconforming Entropy Stable Solver of Any Order on Unstructured Grids. , 2021, , .		1
15	Exploiting low-rank covariance structures for computing high-dimensional normal and Student-t probabilities. <i>Statistics and Computing</i> , 2021, 31, 1.	0.8	3
16	Approximate Error Bounds on Solutions of Nonlinearly Preconditioned PDEs. <i>SIAM Journal of Scientific Computing</i> , 2021, 43, A2526-A2554.	1.3	3
17	The Arab world prepares the exascale workforce. <i>Communications of the ACM</i> , 2021, 64, 82-87.	3.3	1
18	Sum of Kronecker products representation and its Cholesky factorization for spatial covariance matrices from large grids. <i>Computational Statistics and Data Analysis</i> , 2021, 157, 107165.	0.7	1

#	ARTICLE	IF	CITATIONS
19	Leveraging ParSEC Runtime Support to Tackle Challenging 3D Data-Sparse Matrix Problems. , 2021, , .		6
20	Nonlinear Preconditioning Strategies for Two-Phase Flows in Porous Media Discretized by a Fully Implicit Discontinuous Galerkin Method. SIAM Journal of Scientific Computing, 2021, 43, S317-S344.	1.3	10
21	Competition on Spatial Statistics for Large Datasets. Journal of Agricultural, Biological, and Environmental Statistics, 2021, 26, 580-595.	0.7	14
22	An O(N) algorithm for computing expectation of N-dimensional truncated multi-variate normal distribution I: fundamentals. Advances in Computational Mathematics, 2021, 47, 1.	0.8	1
23	High Performance Multivariate Geospatial Statistics on Manycore Systems. IEEE Transactions on Parallel and Distributed Systems, 2021, 32, 2719-2733.	4.0	8
24	Meeting the real-time challenges of ground-based telescopes using low-rank matrix computations. , 2021, , .		11
25	Implications of Reduced Communication Precision in a Collocated Discontinuous Galerkin Finite Element Framework. , 2021, , .		0
26	HLIBCov: Parallel hierarchical matrix approximation of large covariance matrices and likelihoods with applications in parameter identification. MethodsX, 2020, 7, 100600.	0.7	9
27	Hierarchical Matrix Approximations of Hessians Arising in Inverse Problems Governed by PDEs. SIAM Journal of Scientific Computing, 2020, 42, A3397-A3426.	1.3	9
28	A Multilayer Nonlinear Elimination Preconditioned Inexact Newton Method for Steady-State Incompressible Flow Problems in Three Dimensions. SIAM Journal of Scientific Computing, 2020, 42, B1404-B1428.	1.3	8
29	Hierarchical matrix approximations for space-fractional diffusion equations. Computer Methods in Applied Mechanics and Engineering, 2020, 369, 113191.	3.4	5
30	Abstraction Layer For Standardizing APIs of Task-Based Engines. IEEE Transactions on Parallel and Distributed Systems, 2020, 31, 2482-2495.	4.0	2
31	Explicit coupling of acoustic and elastic wave propagation in finite-difference simulations. Geophysics, 2020, 85, T293-T308.	1.4	5
32	Performance study of sustained petascale direct numerical simulation on Cray XC40 systems. Concurrency Computation Practice and Experience, 2020, 32, e5725.	1.4	7
33	Solution of the 3D density-driven groundwater flow problem with uncertain porosity and permeability. GEM - International Journal on Geomathematics, 2020, 11, 1.	0.7	8
34	Fully implicit hybrid two-level domain decomposition algorithms for two-phase flows in porous media on 3D unstructured grids. Journal of Computational Physics, 2020, 409, 109312.	1.9	18
35	Solving Acoustic Boundary Integral Equations Using High Performance Tile Low-Rank LU Factorization. Lecture Notes in Computer Science, 2020, , 209-229.	1.0	7
36	Hierarchical algorithms on hierarchical architectures. Philosophical Transactions Series A, Mathematical, Physical, and Engineering Sciences, 2020, 378, 20190055.	1.6	18

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37	Extreme-Scale Task-Based Cholesky Factorization Toward Climate and Weather Prediction Applications. , 2020, , .		24
38	Asynchronous computations for solving the acoustic wave propagation equation. International Journal of High Performance Computing Applications, 2020, 34, 377-393.	2.4	7
39	Maximizing I/O Bandwidth for Reverse Time Migration on Heterogeneous Large-Scale Systems. Lecture Notes in Computer Science, 2020, , 263-278.	1.0	5
40	Predictive learn and apply: MAVIS application - apply. , 2020, , .		2
41	A Nonlinear Elimination Preconditioned Inexact Newton Algorithm for Steady State Incompressible Flow Problems on 3D Unstructured Meshes. Lecture Notes in Computational Science and Engineering, 2020, , 441-449.	0.1	0
42	Hierarchical-block conditioning approximations for high-dimensional multivariate normal probabilities. Statistics and Computing, 2019, 29, 585-598.	0.8	12
43	Randomized GPU Algorithms for the Construction of Hierarchical Matrices from Matrix-Vector Operations. SIAM Journal of Scientific Computing, 2019, 41, C339-C366.	1.3	10
44	An explicit marching-on-in-time scheme for solving the time domain Kirchhoff integral equation. Journal of the Acoustical Society of America, 2019, 146, 2068-2079.	0.5	9
45	Extreme Scale FMM-Accelerated Boundary Integral Equation Solver for Wave Scattering. SIAM Journal of Scientific Computing, 2019, 41, C245-C268.	1.3	15
46	Batched Triangular Dense Linear Algebra Kernels for Very Small Matrix Sizes on GPUs. ACM Transactions on Mathematical Software, 2019, 45, 1-28.	1.6	8
47	Fast parallel multidimensional FFT using advanced MPI. Journal of Parallel and Distributed Computing, 2019, 128, 137-150.	2.7	37
48	Likelihood approximation with hierarchical matrices for large spatial datasets. Computational Statistics and Data Analysis, 2019, 137, 115-132.	0.7	22
49	Hierarchical Matrix Operations on GPUs. ACM Transactions on Mathematical Software, 2019, 45, 1-28.	1.6	16
50	Application of High Performance Asynchronous Acoustic Wave Equation Stencil Solver into a Land Survey. , 2019, , .		3
51	Geostatistical Modeling and Prediction Using Mixed Precision Tile Cholesky Factorization. , 2019, , .		12
52	Performance Analysis of Tile Low-Rank Cholesky Factorization Using PaRSEC Instrumentation Tools. , 2019, , .		12
53	Mixed-Precision Tomographic Reconstructor Computations on Hardware Accelerators. , 2019, , .		6
54	Efficient Simulations for Contamination of Groundwater Aquifers under Uncertainties. Proceedings in Applied Mathematics and Mechanics, 2019, 19, e201900023.	0.2	0

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55	Leveraging Task-Based Polar Decomposition Using PARSEC on Massively Parallel Systems. , 2019, , .		0
56	Tucker Tensor Analysis of MatÃ©rn Functions in Spatial Statistics. Computational Methods in Applied Mathematics, 2019, 19, 101-122.	0.4	9
57	Combining finite element and finite difference methods for isotropic elastic wave simulations in an energy-conserving manner. Journal of Computational Physics, 2019, 378, 665-685.	1.9	20
58	SBPÃ©SAT finite difference discretization of acoustic wave equations on staggered block-wise uniform grids. Journal of Computational and Applied Mathematics, 2019, 348, 421-444.	1.1	22
59	mpi4py-fft: Parallel Fast Fourier Transforms with MPI for Python. Journal of Open Source Software, 2019, 4, 1340.	2.0	3
60	A Note on Adaptive Nonlinear Preconditioning Techniques. SIAM Journal of Scientific Computing, 2018, 40, A1171-A1186.	1.3	18
61	Accelerated Cyclic Reduction: A distributed-memory fast solver for structured linear systems. Parallel Computing, 2018, 74, 65-83.	1.3	5
62	Parallel accelerated cyclic reduction preconditioner for three-dimensional elliptic PDEs with variable coefficients. Journal of Computational and Applied Mathematics, 2018, 344, 760-781.	1.1	5
63	Fast multipole preconditioners for sparse matrices arising from elliptic equations. Computing and Visualization in Science, 2018, 18, 213-229.	1.2	10
64	On long-time instabilities in staggered finite difference simulations of the seismic acoustic wave equations on discontinuous grids. Geophysical Journal International, 2018, 212, 1098-1110.	1.0	4
65	Asynchronous Task-Based Polar Decomposition on Single Node Manycore Architectures. IEEE Transactions on Parallel and Distributed Systems, 2018, 29, 312-323.	4.0	10
66	Optimizations of Unstructured Aerodynamics Computations for Many-core Architectures. IEEE Transactions on Parallel and Distributed Systems, 2018, 29, 2317-2332.	4.0	11
67	Batched QR and SVD algorithms on GPUs with applications in hierarchical matrix compression. Parallel Computing, 2018, 74, 19-33.	1.3	38
68	Hierarchical Decompositions for the Computation of High-Dimensional Multivariate Normal Probabilities. Journal of Computational and Graphical Statistics, 2018, 27, 268-277.	0.9	21
69	Performance Assessment of Hybrid Parallelism for Large-Scale Reservoir Simulation on Multi- and Many-core Architectures. , 2018, , .		2
70	Parallel Approximation of the Maximum Likelihood Estimation for the Prediction of Large-Scale Geostatistics Simulations. , 2018, , .		16
71	ExaGeoStat: A High Performance Unified Software for Geostatistics on Manycore Systems. IEEE Transactions on Parallel and Distributed Systems, 2018, 29, 2771-2784.	4.0	44
72	Real-Time Massively Distributed Multi-object Adaptive Optics Simulations for the European Extremely Large Telescope. , 2018, , .		7

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73	Tile Low-Rank GEMM Using Batched Operations on GPUs. Lecture Notes in Computer Science, 2018, , 811-825.	1.0	9
74	Scalable soft real-time supervisor for tomographic AO. , 2018, , .		5
75	Exploiting Data Sparsity for Large-Scale Matrix Computations. Lecture Notes in Computer Science, 2018, , 721-734.	1.0	19
76	A High Performance QDWH-SVD Solver Using Hardware Accelerators. ACM Transactions on Mathematical Software, 2017, 43, 1-25.	1.6	13
77	Tile Low Rank Cholesky Factorization for Climate/Weather Modeling Applications on Manycore Architectures. Lecture Notes in Computer Science, 2017, , 22-40.	1.0	24
78	Performance Evaluation of Computation and Communication Kernels of the Fast Multipole Method on Intel Manycore Architecture. Lecture Notes in Computer Science, 2017, , 553-564.	1.0	5
79	Asynchronous Task-Based Parallelization of Algebraic Multigrid. , 2017, , .		4
80	A scalable community detection algorithm for large graphs using stochastic block models. Intelligent Data Analysis, 2017, 21, 1463-1485.	0.4	5
81	Multidimensional Intratile Parallelization for Memory-Starved Stencil Computations. ACM Transactions on Parallel Computing, 2017, 4, 1-32.	1.2	20
82	Communication Reducing Algorithms for Distributed Hierarchical N-Body Problems with Boundary Distributions. Lecture Notes in Computer Science, 2017, , 79-96.	1.0	6
83	Fast Multipole Method as a Matrix-Free Hierarchical Low-Rank Approximation. Lecture Notes in Computational Science and Engineering, 2017, , 267-286.	0.1	3
84	Efficient Supervision Strategy for Tomographic AO Systems on E-ELT. , 2017, , .		1
85	Nonlinear Multiplicative Schwarz Preconditioning in Natural Convection Cavity Flow. Lecture Notes in Computational Science and Engineering, 2017, , 227-235.	0.1	0
86	Performance optimization of Sparse Matrix-Vector Multiplication for multi-component PDE-based applications using GPUs. Concurrency Computation Practice and Experience, 2016, 28, 3447-3465.	1.4	8
87	Optimization of an Electromagnetics Code with Multicore Wavefront Diamond Blocking and Multi-dimensional Intra-Tile Parallelization. , 2016, , .		6
88	On the Robustness and Prospects of Adaptive BDDC Methods for Finite Element Discretizations of Elliptic PDEs with High-Contrast Coefficients. , 2016, , .		3
89	Matrix techniques for approximating large covariance matrices and estimating its parameters. Proceedings in Applied Mathematics and Mechanics, 2016, 16, 731-732.	0.2	0
90	Efficient Sphere Detector Algorithm for Massive MIMO Using GPU Hardware Accelerator. Procedia Computer Science, 2016, 80, 2169-2180.	1.2	11

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91	Redesigning Triangular Dense Matrix Computations on GPUs. Lecture Notes in Computer Science, 2016, , 477-489.	1.0	9
92	Convergence Analysis for the Multiplicative Schwarz Preconditioned Inexact Newton Algorithm. SIAM Journal on Numerical Analysis, 2016, 54, 3145-3166.	1.1	10
93	Accelerated Dimension-Independent Adaptive Metropolis. SIAM Journal of Scientific Computing, 2016, 38, S539-S565.	1.3	10
94	Efficiency of High Order Spectral Element Methods on Petascale Architectures. Lecture Notes in Computer Science, 2016, , 449-466.	1.0	12
95	High-Performance Modeling of Carbon Dioxide Sequestration by Coupling Reservoir Simulation and Molecular Dynamics. SPE Journal, 2016, 21, 0853-0863.	1.7	6
96	Unstructured computational aerodynamics on many integrated core architecture. Parallel Computing, 2016, 59, 97-118.	1.3	9
97	KBLAS. ACM Transactions on Mathematical Software, 2016, 42, 1-31.	1.6	28
98	A performance model for the communication in fast multipole methods on high-performance computing platforms. International Journal of High Performance Computing Applications, 2016, 30, 423-437.	2.4	7
99	High Performance Polar Decomposition on Distributed Memory Systems. Lecture Notes in Computer Science, 2016, , 605-616.	1.0	3
100	Multicore-Optimized Wavefront Diamond Blocking for Optimizing Stencil Updates. SIAM Journal of Scientific Computing, 2015, 37, C439-C464.	1.3	57
101	High Performance Multi-GPU SpMV for Multi-component PDE-Based Applications. Lecture Notes in Computer Science, 2015, , 601-612.	1.0	8
102	A parallel domain decomposition-based implicit method for the Cahn-Hilliard-Cook phase-field equation in 3D. Journal of Computational Physics, 2015, 285, 55-70.	1.9	12
103	Field-Split Preconditioned Inexact Newton Algorithms. SIAM Journal of Scientific Computing, 2015, 37, A1388-A1409.	1.3	55
104	Exploring Shared-Memory Optimizations for an Unstructured Mesh CFD Application on Modern Parallel Systems. , 2015, , .		10
105	Composing Algorithmic Skeletons to Express High-Performance Scientific Applications. , 2015, , .		15
106	Smooth and robust solutions for Dirichlet boundary control of fluid-solid conjugate heat transfer problems. Journal of Computational Physics, 2015, 281, 759-786.	1.9	11
107	Pipelining Computational Stages of the Tomographic Reconstructor for Multi-Object Adaptive Optics on a Multi-GPU System. , 2014, , .		10
108	NKS Method for the Implicit Solution of a Coupled Allen-Cahn/Cahn-Hilliard System. Lecture Notes in Computational Science and Engineering, 2014, , 819-827.	0.1	2

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109	Multiphysics simulations. International Journal of High Performance Computing Applications, 2013, 27, 4-83.	2.4	244
110	Application of PDSLIn to the magnetic reconnection problem. Computational Science & Discovery, 2013, 6, 014002.	1.5	1
111	Optimizing the performance of streaming numerical kernels on the IBM Blue Gene/P PowerPC 450 processor. International Journal of High Performance Computing Applications, 2013, 27, 193-209.	2.4	4
112	Large-scale parameter extraction in electrocardiology models through Born approximation. Inverse Problems, 2013, 29, 015001.	1.0	1
113	Fully Implicit Two-phase Reservoir Simulation with the Additive Schwarz Preconditioned Inexact Newton Method. , 2013, , .		8
114	Systematic Approach in Optimizing Numerical Memory-Bound Kernels on GPU. Lecture Notes in Computer Science, 2013, , 207-216.	1.0	7
115	Topic 14+16: High-Performance and Scientific Applications and Extreme-Scale Computing. Lecture Notes in Computer Science, 2013, , 737-738.	1.0	0
116	Multiplicative Algorithms for Constrained Non-negative Matrix Factorization. , 2012, , .		3
117	Numerical simulation of four-field extended magnetohydrodynamics in dynamically adaptive curvilinear coordinates via Newtonâ€“Krylovâ€“Schwarz. Journal of Computational Physics, 2012, 231, 5822-5853.	1.9	4
118	The International Exascale Software Project roadmap. International Journal of High Performance Computing Applications, 2011, 25, 3-60.	2.4	495
119	Moving grids for magnetic reconnection via Newtonâ€“Krylov methods. Computer Physics Communications, 2011, 182, 173-176.	3.0	4
120	Exaflop/s: The why and the how. Comptes Rendus - Mecanique, 2011, 339, 70-77.	2.1	26
121	Hybrid Programming Model for Implicit PDE Simulations on Multicore Architectures. Lecture Notes in Computer Science, 2011, , 12-21.	1.0	6
122	Hierarchical Programming Models for Exascale Computingâ€“Potential and Challenges. , 2010, , .		0
123	PDE-based Parameter Reconstruction through Schur and Schwarz Decompositions. Lecture Notes in Computational Science and Engineering, 2008, , 543-550.	0.1	1
124	Scalable solver software. Proceedings in Applied Mathematics and Mechanics, 2007, 7, 1026401-1026402.	0.2	0
125	Reconstructing parameters of the FitzHughâ€“Nagumo system from boundary potential measurements. Journal of Computational Neuroscience, 2007, 23, 251-264.	0.6	21
126	Parallel Implicit Solution of Diffusion-limited Radiation Transport. , 2007, , 579-586.		1



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127	Pseudotransient Continuation and Differential-Algebraic Equations. SIAM Journal of Scientific Computing, 2003, 25, 553-569.	1.3	85
128	Nonlinearly Preconditioned Inexact Newton Algorithms. SIAM Journal of Scientific Computing, 2002, 24, 183-200.	1.3	161
129	Non-linear additive Schwarz preconditioners and application in computational fluid dynamics. International Journal for Numerical Methods in Fluids, 2002, 40, 1463-1470.	0.9	55
130	High-performance parallel implicit CFD. Parallel Computing, 2001, 27, 337-362.	1.3	137
131	Globalized Newton-Krylov-Schwarz Algorithms and Software for Parallel Implicit CFD. International Journal of High Performance Computing Applications, 2000, 14, 102-136.	2.4	58
132	Four Horizons for Enhancing the Performance of Parallel Simulations Based on Partial Differential Equations. Lecture Notes in Computer Science, 2000, , 1-17.	1.0	7
133	Trends in Algorithms for Nonuniform Applications on Hierarchical Distributed Architectures. , 2000, , 103-137.		2
134	Prospects for CFD on Petaflops Systems. The IMA Volumes in Mathematics and Its Applications, 2000, , 247-277.	0.5	9
135	A comparison of PETSc library and HPF implementations of an archetypal PDS computation. Advances in Engineering Software, 1998, 29, 415-423.	1.8	4
136	Convergence Analysis of Pseudo-Transient Continuation. SIAM Journal on Numerical Analysis, 1998, 35, 508-523.	1.1	218
137	Parallel Newton-Krylov-Schwarz Algorithms for the Transonic Full Potential Equation. SIAM Journal of Scientific Computing, 1998, 19, 246-265.	1.3	112
138	PROSPECTS FOR CFD ON PETAFLUPS SYSTEMS. , 1998, , 1079-1096.		6
139	Aerodynamic applications of Newton- Krylov-Schwarz solvers. , 1995, , 1-20.		25
140	A comparison of some domain decomposition and ILU preconditioned iterative methods for nonsymmetric elliptic problems. Numerical Linear Algebra With Applications, 1994, 1, 477-504.	0.9	31
141	Towards Polyalgorithmic Linear System Solvers for Nonlinear Elliptic Problems. SIAM Journal of Scientific Computing, 1994, 15, 681-703.	1.3	57
142	Domain Decomposition with Local Mesh Refinement. SIAM Journal on Scientific and Statistical Computing, 1992, 13, 967-993.	1.5	22
143	Parallel Performance of Domain-Decomposed Preconditioned Krylov Methods for PDEs with Locally Uniform Refinement. SIAM Journal on Scientific and Statistical Computing, 1992, 13, 128-145.	1.5	9
144	Convergence rate estimate for a domain decomposition method. Numerische Mathematik, 1992, 61, 153-169.	0.9	12

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145	Domain decomposition methods in computational fluid dynamics. <i>International Journal for Numerical Methods in Fluids</i> , 1992, 14, 147-165.	0.9	24
146	Domain decomposition techniques for the parallel solution of nonsymmetric systems of elliptic boundary value problems. <i>Applied Numerical Mathematics</i> , 1990, 6, 281-301.	1.2	3
147	Domain decomposition methods for the parallel computation of reacting flows. <i>Computer Physics Communications</i> , 1989, 53, 181-200.	3.0	25
148	Domain decomposition on parallel computers. <i>IMPACT of Computing in Science and Engineering</i> , 1989, 1, 421-439.	0.8	25
149	Complexity of Parallel Implementation of Domain Decomposition Techniques for Elliptic Partial Differential Equations. <i>SIAM Journal on Scientific and Statistical Computing</i> , 1988, 9, 312-326.	1.5	38
150	A Comparison of Domain Decomposition Techniques for Elliptic Partial Differential Equations and their Parallel Implementation. <i>SIAM Journal on Scientific and Statistical Computing</i> , 1987, 8, s166-s202.	1.5	157