Peter Richtárik

Publications, Preprints & Technical Reports

- The papers are listed in reverse chronological order in terms of their appearance online.
- Electronic copies of all papers are available on my website and/or on arXiv.
- Coauthors marked with (p), (d), (m) and (i) were my (p)ostdocs, (d)octoral students, (m)aster students and (i)nterns at the time of writing, respectively.

[62] D. Csiba$^{(d)}$and P. Richtárik
Global convergence of arbitrary-block gradient methods for generalized Polyak-Lojasiewicz functions
arXiv:1709.03014

[61] A.A. Ribeiro$^{(p)}$and P. Richtárik
The complexity of primal-dual fixed point methods for ridge regression
Preprint, August 2017

[60] M.J. Ehrhardt, P. Markiewicz, A. Chambolle, P. Richtárik, J. Schott, and C.B. Schönlieb
Faster PET reconstruction with a stochastic primal-dual hybrid gradient method
Preprint, July 2017

[59] A. Dutta$^{(p)}$, X. Li and P. Richtárik
A batch-incremental video background estimation model using weighted low-rank approximation of matrices
To appear in: *ICCV Workshop Proceedings*
arXiv:1707.00281

[58] F. Hanzely$^{(d)}$, J. Konečný$^{(d)}$, N. Loizou$^{(d)}$, P. Richtárik and D. Grishchenko$^{(i)}$
Privacy preserving randomized gossip algorithms
arXiv:1706.07636

[57] A. Chambolle, M.J. Ehrhardt, P. Richtárik and C.B. Schönlieb
Stochastic primal-dual hybrid gradient algorithm with arbitrary sampling and imaging applications
arXiv:1706.04957

[56] P. Richtárik and M. Takáč
Stochastic reformulations of linear systems: algorithms and convergence theory
arXiv:1706.01108

[55] M. Mutný$^{(i)}$and P. Richtárik
Parallel stochastic Newton method
To appear in: *Journal of Computational Mathematics*
arXiv:1705.02005

[54] R.M. Gower and P. Richtárik
Linearly convergent randomized iterative methods for computing the pseudoinverse
arXiv:1612.06255

[53] J. Konečný[(d)] and P. Richtárik
Randomized distributed mean estimation: accuracy vs communication
arXiv:1611.07555
Federated learning paper

[52] J. Konečný[(d)], H. B. McMahan, F. Yu, P. Richtárik, A.T. Suresh and D. Bacon
Federated learning: strategies for improving communication efficiency
NIPS Private Multi-Party Machine Learning Workshop, 2016
Federated learning paper

[51] J. Konečný[(d)], H. B. McMahan, D. Ramage and P. Richtárik
Federated optimization: distributed machine learning for on-device intelligence
arXiv:1610.02527
Federated learning paper

[50] N. Loizou[(d)] and P. Richtárik
A new perspective on randomized gossip algorithms
The 4th IEEE Global Conf. on Signal and Information Processing (GlobalSIP), 2016

[49] S. J. Reddi, J. Konečný[(d)], P. Richtárik, B. Póczos and A. Smola
AIDE: Fast and communication efficient distributed optimization
arXiv:1608.06879

[48] D. Csiba[(d)] and P. Richtárik
Coordinate descent face-off: primal or dual?
arXiv:1605.08982

[47] O. Fercoq[(p)] and P. Richtárik
Optimization in high dimensions via accelerated, parallel and proximal coordinate descent[1]
SIAM Review 58(4), 2016
SIAM SIGEST Outstanding Paper Award

[46] R. M. Gower[(d)], D. Goldfarb and P. Richtárik
Stochastic block BFGS: squeezing more curvature out of data
Proceedings of The 33rd International Conference on Machine Learning, pp. 1869-1878, 2016

[45] D. Csiba[(d)] and P. Richtárik
Importance sampling for minibatches
arXiv:1602.02283

[44] R. M. Gower[(d)] and P. Richtárik
Randomized quasi-Newton updates are linearly convergent matrix inversion algorithms
To appear in: *SIAM Journal on Matrix Analysis and Applications*
arXiv:1602.01768

[43] Z. Allen-Zhu, Z. Qu, P. Richtárik and Y. Yuan
Even faster accelerated coordinate descent using non-uniform sampling
Proceedings of The 33rd International Conference on Machine Learning, pp. 1110–1119, 2016

[1] A (refreshed) reprint of [21] originally published in SIAM Journal on Optimization

[42] R. M. Gower[(d)] and P. Richtárik
Stochastic dual ascent for solving linear systems
arXiv:1512.06890

[41] C. Ma, J. Konečný[(d)], M. Jaggi, V. Smith, M. I. Jordan, P. Richtárik and M. Takáč
Distributed optimization with arbitrary local solvers
Optimization Methods and Software 32(4), 813-848, 2017

[40] M. Takáč, P. Richtárik and N. Srebro
Distributed minibatch SDCA
arXiv:1507.08322

[39] R. M. Gower[(d)] and P. Richtárik
Randomized iterative methods for linear systems
SIAM Journal on Matrix Analysis and Applications 36(4):1660-1690, 2015
Most Downloaded Paper from the SIMAX Website, 2016-2017

[38] D. Csiba[(d)] and P. Richtárik
Primal method for ERM with flexible mini-batching schemes and non-convex losses
arXiv:1506:02227

[37] J. Konečný[(d)], J. Liu, P. Richtárik and M. Takáč
Mini-batch semi-stochastic gradient descent in the proximal setting
IEEE Journal of Selected Topics in Signal Processing 10(2), 242–255, 2016
Konečný: BASP Frontiers Best Contribution Award, 2015

[36] R. Tappenden[(p)], Martin Takáč[(d)] and P. Richtárik
On the complexity of parallel coordinate descent
arXiv:1503.03033

[35] D. Csiba[(d)], Z. Qu[(p)] and P. Richtárik
Stochastic dual coordinate ascent with adaptive probabilities
Proceedings of The 32nd International Conference on Machine Learning, pp. 674–683, 2015
Csiba: Best Contribution Award (2nd Prize), Optimization and Big Data 2015

[34] C. Ma, V. Smith, M. Jaggi, M. I. Jordan, P. Richtárik and M. Takáč
Adding vs. averaging in distributed primal-dual optimization
Proceedings of The 32nd International Conference on Machine Learning, pp. 1973–1982, 2015
Smith: 2015 MLconf Industry Impact Student Research Award

[33] Z. Qu[(p)], P. Richtárik, M. Takáč[(d)] and O. Fercoq[(p)]
SDNA: Stochastic dual Newton ascent for empirical risk minimization
Proceedings of The 33rd International Conference on Machine Learning, pp. 1823–1832, 2016

[32] Z. Qu[(p)] and P. Richtárik
Coordinate descent with arbitrary sampling II: expected separable overapproximation
Optimization Methods and Software 31(5), 858-884, 2016

[31] Z. Qu[(p)] and P. Richtárik
Coordinate descent with arbitrary sampling I: algorithms and complexity
Optimization Methods and Software 31(5), 829-857, 2016

[30] J. Konečný[(d)], Z. Qu[(p)] and P. Richtárik
Semi-stochastic coordinate descent
Optimization Methods and Software, 2017

[29] Z. Qu[(p)], P. Richtárik and T. Zhang
Quartz: Randomized dual coordinate ascent with arbitrary sampling
Advances in Neural Information Processing Systems 28, 865–873, 2015

[28] J. Konečný[(d)], J. Liu, P. Richtárik and M. Takáč[(d)]
mS2GD: Mini-batch semi-stochastic gradient descent in the proximal setting
OPT 2014 (NIPS Workshop on Optimization for Machine Learning)

[27] J. Konečný[(d)], Z. Qu[(p)] and P. Richtárik
S2CD: Semi-stochastic coordinate descent
OPT 2014 (NIPS Workshop on Optimization for Machine Learning)

[26] J. Konečný[(d)] and P. Richtárik
Simple complexity analysis of simplified direct search
arXiv:1410.0390

[25] J. Mareček[(p)], P. Richtárik and M. Takáč[(d)]
Distributed block coordinate descent for minimizing partially separable functions
Numerical Analysis and Optimization, Springer Proc. in Math. and Statistics 134:261–288, 2015

[24] O. Fercoq[(p)], Z. Qu[(p)], P. Richtárik and M. Takáč[(d)]
Fast distributed coordinate descent for minimizing non-strongly convex losses
In 2014 IEEE Int. Workshop on Machine Learning for Signal Processing (MLSP), 2014

[23] D. Forgan and P. Richtárik
On optimal solutions to planetesimal growth models
Technical Report ERGO 14-002, 2014

[22] J. Mareček[(p)], P. Richtárik and M. Takáč[(d)]
Matrix completion under interval uncertainty
European Journal of Operational Research 256(1):35–43, 2017

[21] O. Fercoq[(p)] and P. Richtárik
Accelerated, parallel and proximal coordinate descent
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2nd Most Downloaded Paper from the SIOPT Website, 2016

[20] J. Konečný[(d)] and P. Richtárik
Semi-stochastic gradient descent
Frontiers in Applied Mathematics and Statistics 3:1-14, 2017

[19] P. Richtárik and M. Takáč[(d)]
On optimal probabilities in stochastic coordinate descent methods
Optimization Letters 10(6):1233–1243, 2016

[18] P. Richtárik and M. Takáč[(d)]
Distributed coordinate descent method for learning with big data

Journal of Machine Learning Research 17 (75):1–25, 2016

[17] O. Fercoq[(p)] and P. Richtárik
Smooth minimization of nonsmooth functions with parallel coordinate descent methods
arXiv:1309.5885

[16] R. Tappenden[(p)], P. Richtárik and B. Büke
Separable approximations and decomposition methods for the augmented Lagrangian
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[15] R. Tappenden[(p)], P. Richtárik and J. Gondzio
Inexact coordinate descent: complexity and preconditioning
Journal of Optimization Theory and Applications 171 (1):144–176, 2016

[14] M. Takáč[(d)], S. D. Ahipasaoglu, N. M. Cheung and P. Richtárik
TOP-SPIN: TOPic discovery via Sparse Principal component INterference
arXiv:1311.1406

[13] M. Takáč[(d)], A. Bijral, P. Richtárik and N. Srebro
Mini-batch primal and dual methods for SVMs
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[12] P. Richtárik, M. Takáč[(d)] and S. D. Ahipasaoglu
Alternating maximization: unifying framework for 8 sparse PCA formulations and efficient parallel codes
arXiv:1212.4137

[11] W. Hulme[(m)], P. Richtárik, L. McGuire and A. Green
Optimal diagnostic tests for sporadic Creutzfeldt-Jakob disease based on SVM classification of RT-QuIC data
arXiv:1212.2617

[10] P. Richtárik and M. Takáč[(d)]
Parallel coordinate descent methods for big data optimization
Mathematical Programming 156(1):433–484, 2016
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[9] P. Richtárik and M. Takáč[(d)]
Efficient serial and parallel coordinate descent methods for huge-scale truss topology design
Operations Research Proceedings 2011:27–32, Springer, 2012

[8] P. Richtárik and M. Takáč[(d)]
Iteration complexity of randomized block-coordinate descent methods for minimizing a composite function
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Takáč: Best Student Paper Award (sole runner-up), INFORMS Computing Society, 2012

[7] P. Richtárik and M. Takáč[(d)]
Efficiency of randomized coordinate descent methods on minimization problems with a composite objective function
In Proceedings of Signal Processing with Adaptive Sparse Structured Representations, 2011

[6] P. Richtárik
Finding sparse approximations to extreme eigenvectors: generalized power method for sparse PCA and extensions
In Proceedings of Signal Processing with Adaptive Sparse Structured Representations, 2011

[5] P. Richtárik
Approximate level method for nonsmooth convex optimization
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[4] M. Journée, Yu. Nesterov, P. Richtárik and R. Sepulchre
Generalized power method for sparse principal component analysis
Journal of Machine Learning Research 11:517–553, 2010

[3] P. Richtárik
Improved algorithms for convex minimization in relative scale
SIAM Journal on Optimization 21(3):1141–1167, 2011

[2] P. Richtárik
Simultaneously solving seven optimization problems in relative scale
Technical Report, Optimization Online, 2008

[1] P. Richtárik
Some algorithms for large-scale linear and convex minimization in relative scale
PhD thesis, School of ORIE, Cornell University, 2007

Patents

2015 M. Takáč, S. D. Ahipasaoglu, P. Richtárik and N. M. Cheung
Method and system for classifying images
Patent# WO/2015/011470