Lorenzo Stella

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Professional Experience

Sept 2015 – now Visiting PhD student at KU Leuven, Leuven (Belgium), Departement Elektrotechniek (ESAT), Stadius division. www.esat.kuleuven.be/stadius

Teaching assistant, exercises and laboratory sessions for the Optimization class (H03E3a, taught by Panos Patrinos).

Feb 2013 – now PhD student at IMT School for Advanced Studies, Lucca (Italy). www.imtlucca.it

Convex optimization, operator splitting methods. Derivation, analysis and implementation of line-search methods based on the concept of *splitting envelope* function, to tackle nonsmooth (possibly constrained) optimization problems (both convex and nonconvex) with classical smooth unconstrained techniques. Applications to optimal control problems, distributed optimization and large-scale problems arising in machine learning, image processing.

2011 – 2012 Research Analyst at COSBI, Trento (Italy). www.cosbi.eu

Analysis and simulation of stochastic models in systems biology (PK/PD, metabolic networks). Inference and analysis of gene regulatory networks. Development of tools for stochastic simulation and network analysis in C#, Python and Matlab languages.

Education

2008 – 2011 M.S. in Computer Science, University of Florence, 110/110 cum laude.

Thesis supervised by Prof. Luigi Brugnano, *Efficient methods for the numerical solution of Hamiltonian problems*. Analysis of the effectiveness of numerical methods for ODEs with respect to the conservation of energy in the case of Hamiltonian systems. Efficient implementation of such techniques, using a framework developed *ad hoc* in C.

2004 – 2008 B.S. in Computer Science, University of Florence, 110/110.

Thesis supervised by Prof. Luigi Brugnano, *Numerical methods in Linear Algebra with applications to Google's Pagerank*. Study of the *random surfer* model and possible approaches to the calculation of the stationary point of the Markov chain associated with it. The approaches and algorithms presented were compared on the basis of experimental results obtained with Matlab implementations.

Publications

(Google Scholar: scholar.google.com/citations?user=Y3ag8YsAAAAJ)

2016 A. Themelis, L. Stella, and P. Patrinos, *Forward-backward envelope for the sum of two nonconvex functions: Further properties and nonmonotone line-search algorithms*, ArXiv preprint, (2016)

L. Stella, A. Themelis, and P. Patrinos, *Forward-backward quasi-Newton methods for nonsmooth optimization problems*, ArXiv preprint, (2016)

P. Latafat, L. Stella, and P. Patrinos, *New primal-dual proximal algorithms for distributed optimization*, Accepted to the 55th IEEE Conference on Decision and Control, Las Vegas, NV, USA, (2016)

2014 P. Patrinos, L. Stella, and A. Bemporad, *Douglas-Rachford splitting: complexity estimates and accelerated variants*, Proceedings of the 53rd IEEE Conference on Decision and Control, Los Angeles, CA, USA, (2014)

——, *Forward-backward truncated Newton methods for convex composite optimization*, ArXiv preprint, (2014)

Talks and seminars

Nov. 2015 "Proximal quasi-Newton methods for nonsmooth composite optimization problems," at the KU Leuven Optimization in Engineering Center (OPTEC), Spa, Belgium.

Jul. 2015 "Accelerated L-BFGS for large scale nonsmooth convex optimization," at the 22nd International Symposium on Mathematical Programming (ISMP 2015), Pittsburgh, PA, USA.

Dec. 2014 "Douglas-Rachford splitting: complexity estimates and accelerated variants," at the 53rd IEEE Conference on Decision and Control (CDC 2014), Los Angeles, CA, USA.

Software projects

(GitHub: `github.com/lostella`)

ForBES Generic and efficient Matlab solver for nonsmooth optimization problems. The solver is provided with a library of mathematical functions used to model problems arising in numerous application fields such as control, machine learning, image and signal processing. Each function embeds the operators which are relevant for optimization purposes (such as gradient and proximal mappings).

Web page: `kul-forbes.github.io/ForBES`

libForBES Framework in C++ for modeling and solving large-scale nonsmooth optimization problems. Started as a low-level implementation of ForBES, to overcome the drawbacks of Matlab, it will allow to interface many high-level languages (including R, Python, Julia) to a unique solver capable of addressing nonsmooth optimization problems from several application fields.

Web page: `kul-forbes.github.io/libForBES`

libLBFGS Library written in C containing the structures and routines necessary for computing search directions in the limited-memory BFGS algorithm (L-BFGS), for large-scale smooth unconstrained optimization. Contains a Mex interface to Matlab.

Web page: `github.com/lostella/libLBFGS`

Summary of technical skills

Programming C, Python, MATLAB (expert).

C++, Java, Julia (proficient).

C#, Haskell, Scheme, R (prior experience).

Languages

English Native

Italian Native

Updated July 27, 2016