

Center for Informatics and Computational Science

Scalable Stochastic Programming for Energy Systems



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Time: 4:00 pm – 5:00 pm
Date: Monday, January 29th, 2018
Venue: B01 McCourtney

Abstract

We discuss scalable approaches and implementation for solving stochastic programming problems, with application to the optimization of complex energy systems under uncertainty. Stochastic programming is used to make decisions in the present while incorporating a model of uncertainty about future events (scenarios). These problems present serious computational difficulties as the number of scenarios becomes large and the complexity of the system and planning horizons increase, necessitating the use of parallel computing. We will discuss a series of technical ideas to achieve scalability, some of which have been implemented in the PIPS suite for stochastic programming, developed at Argonne National Laboratory. We demonstrate their effects on large scale problems that have been executed with more than 100 000-way parallelism. We also discuss remaining challenges and some possible ways forwards.

Biography

Dr. Anitescu has been a Senior Computational Mathematician in the Mathematics and Computer Science Division at Argonne National Laboratory since 2013, previously a Computational Mathematician between 2002-2013. He is tenured Professor in the Department of Statistics at the University of Chicago since 2012, jointly appointed with Argonne. Previously, he served as part-time Professor of Statistics at the University of Chicago since 2009. Between 1999 and 2002 he was an Assistant Professor of Mathematics at the University of Pittsburgh. From 1997 to 1999 he was the Wilkinson Fellow in scientific computing at Argonne. He is currently an associate editor (AE) for *Mathematical Programming series A and B*, *SIAM Journal on Optimization*, *SIAM Journal on Uncertainty Quantification* and a software editor for *Optimization Methods and Software*; He also served as AE for the *SIAM Journal on Scientific Computing*. He specializes in numerical optimization, numerical analysis, and uncertainty quantification. He has advised two PhD students at Pitt, three PhD students at the University of Chicago, four Masters students at the University of Chicago, 27 summer interns at Argonne, and 23 postdoctoral scholars at Argonne.