AIChE Webinar Series

Computing & Systems Technology Division (CAST) Welcomes

Victor Zavala, Ph.D.

Richard H. Soit Assistant Professor
Department of Chemical and Biological Engineering

WISCONSIN
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Nonlinear Programming at Small Scales: Doing More with Less

We discuss how emerging trends in computing are pushing traditionally-passive devices to perform higher level functions such data processing and predictive control. This requires of new algorithmic implementations that can operate under computing environments that are constrained by memory, power, and speed. We present a modified filter line-search algorithm that enables primal-dual regularization of the augmented system that in turn permits the use of linear algebra strategies with lower computing overheads. We prove that the proposed the algorithm is globally convergent and demonstrate the developments using a nonconvex real-time optimization application for a building heating, ventilation, and air conditioning system. Our numerical tests are performed on a standard processor and on an embedded platform and demonstrate that the approach improves solution times by up to three orders of magnitude compared to IPOPT.

Biography:

Victor M. Zavala is the Richard H. Soit Assistant Professor in the Department of Chemical and Biological Engineering at the University of Wisconsin-Madison. Before joining UW-Madison, he was a computational mathematician in the Mathematics and Computer Science Division at Argonne National Laboratory. He holds a B.Sc. degree from Universidad Iberoamericana and a Ph.D. degree from Carnegie Mellon University, both in chemical engineering. He is currently the recipient of a Department of Energy Early Career Award under which he develops scalable optimization algorithms. He is on the editorial board of the Journal of Process Control and Mathematical Programming Computation. His research interests are in the areas of mathematical modeling of energy systems, high-performance computing, stochastic optimization, and predictive control.

Join Webinar on Apr 25 at 11 AM Eastern Standard Time (EST) at http://goo.gl/5ySqO4