Efficient Computation of Sparse Jacobians and Hessians Using Automatic Differentiation

Dr. Assefaw Gebremedhin
Purdue University
Computing Research Institute and Department of Computer Science

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Abstract: Automatic differentiation (AD) is a technology for transforming a computer program for computing a function into a program for computing derivatives (sensitivities) of the function. The talk will begin with a brief discussion of AD principles and tools, and then describe the work on algorithms and software for making the computation of large, sparse Jacobians and Hessians using AD efficient.

In particular, we will discuss ColPack, a graph coloring software package that was developed to support derivative computation via compression, and its integration within the operator overloading based AD tool ADOL-C, developed at the Technical University of Dresden in Germany.

Bio: Assefaw Gebremedhin is a Research Assistant Professor at the Computing Research Institute and Department of Computer Science at Purdue University. He is a member of the CSCAPES SciDAC Institute, and had been working at Old Dominion University prior to his current appointment. Assefaw received his PhD in Computer Science from the University of Bergen, Norway, in 2003. His research interests include algorithmics, parallel computing, combinatorial scientific computing, and automatic differentiation.