Department of Mathematics University of Houston

Seminar on Computational Mathematics in Oil & Gas Exploration and Imaging

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Adjoint Methods for Gradient Computations, Theory

Tuesday, March 22, 2016 1:30 PM – 2:30 PM Room 646 PGH

Abstract: If we are trying to minimize f(x), it makes sense to look at f'(x) as we have learned in basic calculus. If x is a vector of parameters and if f(x) is the solution of a set of differential equations which can take some time to solve, then finding f'(x) is not easy. Adjoint methods give us a nice theoretical trick that can help us find a "descent" direction without actually computing the Jacobian of f. In this talk, I will walk through the steps of computing the adjoint for a simple 1D wave equation. The same procedure can be followed to obtain the adjoint of pretty much any system that allows integration by parts.