

# ACMS Applied Math Seminar

**Nathan Bliss**  
**Thursday, March 9**  
**154 Hurley Hall**  
**3:30- 4:30 PM**



## **The Method of Gauss-Newton to Compute Power Series Solutions of Polynomial Homotopies**

We consider the extension of the method of Gauss-Newton from complex floating-point arithmetic to the field of truncated power series with complex floating-point coefficients. With linearization we formulate a linear system where the coefficient matrix is instead a series with matrix coefficients. We show that in the regular case, the solution of the linear system satisfies the conditions of the Hermite interpolation problem. In general, we solve a Hermite-Laurent interpolation problem, via a lower triangular echelon form on the coefficient matrix. We conclude with a few illustrative examples, with an eye toward homotopy continuation.

The Department of Applied and Computational  
Mathematics and Statistics

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