

# Special PHYSICAL MATHEMATICS SEMINAR

## ASYMPTOTIC INTERPOLATION AND THE SUPERACCURATE DETERMINATION OF SINGULARITIES FROM TAYLOR AND FOURIER SERIES

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### **ABSTRACT:**

Given a Taylor series with a finite radius of convergence, its Borel transform defines an entire function. A theorem of Pólya relates the large distance behavior of the Borel transform in different directions to singularities of the original function. With the help of the new asymptotic interpolation method of van der Hoeven, we show that from the knowledge of a large number of Taylor coefficients we can identify precisely the location of such singularities, as well as their type when they are isolated. There is no risk of getting artefacts with this method, which also gives us access to some of the singularities beyond the convergence disk. The method can also be applied to Fourier series of analytic periodic functions and is here tested on various instances constructed from solutions to the Burgers equation. Large precision on scaling exponents (up to twenty accurate digits) can be achieved.

**WEDNESDAY, DECEMBER 13, 2006**

**4:00 PM**

**Building 4, Room 237**

*Reception at 3:30 PM in Building 2, Room 349  
(Applied Math Common Room)*



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