数学与系统科学研究院

计算数学所学术报告

报告人：　**Dr. Xiangtao Liu**

（ *Department of Psychiatry, University of Iowa* ）

报告题目：

A fast algorithm for the calculation of the roots of special functions

邀请人：　　唐贻发 研究员

报告时间：**2016** 年 **2** 月 **25** 日（周四）

上午 **10:30~11:30**

报告地点：　　数学院南楼七层

702 会议室

Abstract:

We developed a procedure for the determination of the roots of functions satisfying second-order ordinary differential equations, including the classical special functions. The scheme is based on a combination of the Prüfer transform with the classical Taylor series method for the solution of ordinary differential equations and requires O(1) operations for the determination of each root. When the functions in question are classical orthogonal polynomials (Legendre, Hermite, etc.), the techniques presented here also provide tools for the evaluation of the weights for the associated Gaussian quadratures. The performance of the scheme for several classical special functions (prolate spheroidal wave functions, Bessel functions, and Legendre, Hermite, and Laguerre polynomials) is illustrated with numerical examples.

Keywords: Roots, special functions, Gaussian quadratures, Sturm-Liouville.

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