数学与系统科学研究院

计算数学所学术报告

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报告题目：

On complex oscillation theory, quasi-exact solvability and Fredholm Integral Equations

邀请人：　胡星标 研究员

报告时间：**2014** 年 **3** 月 **21** 日（周五）

晚上 **20:00~21:00**

报告地点：　科技综合楼三层 **311**

计算数学所报告厅

Abstract:

Biconfluent Heun equation (BHE) is a confluent case of the general Heun equation which has one more regular singular points than the Gauss hypergeometric equation on the Riemann sphere $\hat{\mathbb{C}}$. Motivated by a Nevanlinna theory (complex oscillation theory) approach, we have established a theory of periodic BHE (PBHE) in parallel with the Lam\'e equation verses the Heun equation, and the Mathieu equation verses the confluent Heun equation. We have established condition that lead to explicit construction of eigen-solutions of PBHE, and their single and double orthogonality, and a related first-order Fredholm-type integral equation for which the corresponding eigen-solutions must satisfy. We have also established a Bessel polynomials analogue at the BHE level which is based on the observation that both the Bessel equation and the BHE have a regular singular point at the origin and an irregular singular point at infinity on the Riemann sphere $\hat{\mathbb{C}}$, and that the former equation has orthogonal polynomial solutions with respect to a complex weight. Finally, we relate our results to an equation considered by Turbiner, Bender and Dunne, etc concerning a quasi-exact solvable Schr\"odinger equation generated by first order operators such that the second order operators possess a finite-dimensional invariant subspace in a Lie algebra of $SL_2(\mathbb{C})$.

This is a joint work with Yik-Man Chiang (hkust).

欢迎大家参加！