國 立 東 華 大 學 應 用 數 學 系
專 題 演 講

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講　　題：λ-Toeplitz operators with analytic symbols

時　　間：99年10月27日（星期三）10:10-12:00

摘　　要

Let λ be a complex number in the closed unit disc $\overline{D}$, and H be a separable Hilbert space with the orthonormal basis, say, $\varepsilon = \{e_n : n = 0,1,2,\ldots\}$. A bounded operator T on H is called a λ-Toeplitz operator if $\langle \mathrm{T}e_{m+1}, e_{n+1}\rangle = \lambda\langle \mathrm{T}e_m, e_n\rangle$ (where $\langle\cdot,\cdot\rangle$ is the inner product on H). The L^2 function $\varphi \sim \Sigma a_n e^{in\theta}$ with $a_n = \langle Te_0, e_n\rangle$ for $n \geq 0$ and $a_n = \langle Te_n, e_0\rangle$ for n < 0 is, on the other hand, called the symbol of T. The subject arises naturally from a special case of the operator equation

$$S^* AS = \lambda A + B, \text{ where S is a shift on H,}$$

which plays an essential role in finding bounded matrix (a_{ij}) on $l^2(\mathrm{Z})$ that solves the system of equations

$$\begin{cases} a_{2i,2j} &= p_{ij} + aa_{ij} \\ a_{2i,2j-1} &= q_{ij} + ba_{ij} \\ a_{2i-1,2j} &= v_{ij} + ca_{ij} \\ a_{2j-1,2j-1} &= w_{ij} + da_{ij} \end{cases}$$

for all $i, j \in \mathrm{Z}$ where $(p_{ij}), (q_{ij}), (v_{ij}), (w_{ij})$ are bounded matrices on $l^2(\mathrm{Z})$ and $a, b, c, d \in C$. It is also clear that the well-known Toeplitz operators are precisely the solutions of $S^*AS = A$, when S is the unilateral shift. In this paper, we will determine the spectra of λ-Toeplitz operators with |λ| = 1 of finite order, and when the symbols are analytic with C^1 boundary values.

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