

Inverse of Ill-Conditioned Band Triangular Toeplitz Matrices

Fu-Rong Lin¹

frlin@stu.edu.cn

DEPARTMENT OF MATHEMATICS, SHANTOU UNIVERSITY, CHINA

In this talk, we discuss the inverse of ill-conditioned triangular Toeplitz matrices $T_n[p_t]$ generated by

$$p_t(\theta) = \prod_{j=1}^s (1 - e^{i(\theta-\theta_j)})^{\mu_j}, \quad -\pi \leq \theta \leq \pi,$$

where $\mu_j > 0$, $j = 1, \dots, s$ are integers. We will give a formula for the entries of $(T_n[p_t])^{-1}$. Based on the formula, we discuss the condition number of $T_n[p_t]$ and address some theoretical problems in the paper “F. R. Lin and W. K. Ching, *Inverse Toeplitz preconditioners for Hermitian Toeplitz systems*, Numerical Linear Algebra with Applications, 12 (2005), pp. 221–229.”.

¹The research was supported by the NSF of China No. 10271070 and the Guangdong Provincial NSF No. 021244.