1014-65-70 **Weidong Chen*** (chenw@math.ksu.edu), 1541 International CT, 11, Manhattan, KS 66502. *An Efficient Method for Band-limited Extrapolation by Regularization.*

A function $f \in L^1(\mathbf{R})$ is Ω-*band-limited* if its Fourier transform $\hat{f}(\omega) = 0, \quad \forall \omega \notin [-\Omega, \Omega]$. We then have the inversion formula:

$$f(t) = \frac{1}{2\pi} \int_{-\Omega}^{\Omega} \hat{f}(\omega) e^{-i\omega t} d\omega, \quad a.e. \quad t \in \mathbf{R}$$

The extrapolation problem is:

$$\begin{aligned} given \quad & f(t) \quad t \in [-T, T] \\ find \quad & f(t) \quad t \notin [-T, T] \end{aligned}$$

where $T = const. > 0$.

A regularized spectral estimation formula and a regularized iterative algorithm for band-limited extrapolation are presented. The ill-posedness is taken into account. First the Fredholm equation is regularized. Then it is transformed to a differential equation in the case where the time interval is R. A fast algorithm to solve the differential equation is given by the finite difference and a regularized spectral estimation formula is obtained. Then a regularized iterative extrapolation algorithm is introduced and compared with the Papoulis and Gerchberg algorithm. (Received July 17, 2005)