

# A GENERALIZED FOURIER TRANSFORM AND CONVOLUTION ON TIME SCALES

## ABSTRACT

In this paper, authors develop some important Fourier analysis tools in the context of time scales. A generalized Fourier transform and the critical inversion result are presented. This leads to a convolution for signals on two (possibly distinct) time scales as well as several natural classes of time scales which arise in this setting: dilated, closed under addition, and additively idempotent.

Some properties of these time scales and demonstrate the utility of these concepts in discrete convolution, Mellin convolution, and transformation of a random variable are explored.