

## Accepted Manuscript

Title: A sampling theorem of chirp periodic and non-bandlimited signals from finite set of samples associated with the fractional Fourier transform

Author: Zhi-Chao Zhang



PII: S0030-4026(16)31221-9

DOI: <http://dx.doi.org/doi:10.1016/j.ijleo.2016.10.054>

Reference: IJLEO 58322

To appear in:

Received date: 15-8-2016

Accepted date: 18-10-2016

Please cite this article as: Zhi-Chao Zhang, A sampling theorem of chirp periodic and non-bandlimited signals from finite set of samples associated with the fractional Fourier transform, <![CDATA[Optik - International Journal for Light and Electron Optics]]> (2016), <http://dx.doi.org/10.1016/j.ijleo.2016.10.054>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# A sampling theorem of chirp periodic and non-bandlimited signals from finite set of samples associated with the fractional Fourier transform

Zhi-Chao Zhang\*

*College of Mathematics, Sichuan University, Chengdu 610065, China*

---

## Abstract

Recently, Shi et al. constructed a class of function spaces and proposed a sampling theorem without band-limiting constraint for the fractional Fourier transform (FRFT) in this kind of function spaces. The authors also investigated the truncation error of the sampling theorem. In this paper we consider a small class of signals in the function spaces, that is, the chirp periodic signals associated with the FRFT. Then, we deduce a perfect interpolation formula for this type of signals by making use of the Zak transform (ZT), which interpolates the finite set of spaced samples. We also show that the interpolation formula for chirp periodic and bandlimited signals in the FRFT domain from finite number of uniformly spaced samples is a special case of the derived result. Moreover, we present some applications to demonstrate that the proposed reconstruction method achieves better performance than the previous.

*Keywords:* Fractional Fourier transform; Sampling theorem; Chirp periodic; Non-bandlimited; Zak transform

---

## 1. Introduction

The fractional Fourier transform (FRFT), which is a generalized form of the classical Fourier transform (FT) [1], has found many applications in the field of optics and signal processing [2–9].

---

\*Corresponding author; Tel: 0086-028-18782994260.

*Email address:* zhangzhichao\_scu@sina.cn, zhchzhang@stu.scu.edu.cn (**Zhi-Chao Zhang**)

Download English Version:

<https://daneshyari.com/en/article/5026155>

Download Persian Version:

<https://daneshyari.com/article/5026155>

[Daneshyari.com](https://daneshyari.com)