

FX and FK Interpolation Methods and Further Developments for Irregularly Spaced Traces

Mostafa Naghizadeh*

University of Alberta, Edmonton, Alberta, Canada
mnaghi@phys.ualberta.ca

and

Mauricio Sacchi

University of Alberta, Edmonton, Alberta, Canada

Abstract

FX and FK interpolation methods are compared and their advantages and shortcomings are discussed. Auto-regressive (AR) modeling is the basic idea behind FX interpolation methods (Spitz, 1991; Porsani, 1999). In this case, the underlying model for data reconstruction is a model where a few plane waves are considered within the data aperture. In a similar manner, FK interpolation methods (Gulunay, 2003) also assume that the data are composed of a few plane waves. In both cases, processing small apertures is required to validate the assumptions on which these methods were built on. Regardless of the aforementioned shortcomings, these methods provide a robust way of interpolating aliased data. It is desirable, however, to extend these ideas to the irregular sampling case. This problem can be tackled with an AR formulation for continuous processes (Larsson and Torsten, 2002). The performance of the irregular AR trace interpolation depends on the following parameters a) the number of missing traces b) the size of the biggest and smallest gaps c) the location of the gaps inside the data aperture d) the dip of events. Statistically, it is quite important to have a well-sampled distribution of distances between traces and to have enough data to obtain an unbiased estimator of the prediction filter components for the irregularly sampled data.

References

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