

10th International Conference "Distributed Computing and Grid Technologies in Science and Education" (GRID'2023)



Contribution ID: 289

Type: **not specified**

Fourier-space digital filter for neutron noise analysis

Tuesday, 4 July 2023 14:00 (15 minutes)

Discrete Fourier methods have the known Gibbs phenomenon problematic due to their limited time window. A solution to this problem has been apodisation, a truncation of the time window that softens the edges. Still, due to discretisation such methods are imperfect, here reported Fourier apodisation alleviating this aspect. Although Fourier-space apodisation is known, no consistent approach exists to date, that eliminates exactly spectrum leakage tails. Our FoxLima discrete Fourier transform package, fielding these methods, has been adapted to design a wavelet digital filter with this type of Fourier-space apodisation. We report the performance of this filter on neutron noise simulated data.

Summary

Discrete Fourier methods have the known Gibbs phenomenon problematic due to their limited time window. A solution to this problem has been apodisation, a truncation of the time window that softens the edges. Still, due to discretisation such methods are imperfect, here reported Fourier apodisation alleviating this aspect. Although Fourier-space apodisation is known, no consistent approach exists to date, that eliminates exactly spectrum leakage tails. Our FoxLima discrete Fourier transform package, fielding these methods, has been adapted to design a wavelet digital filter with this type of Fourier-space apodisation. We report the performance of this filter on neutron noise simulated data.

Primary author: DIMA, Mihai-Tiberiu (JINR - MLIT)

Co-authors: MIHAILESCU, Madalina (Hyperion University Bucharest); DIMA, Maria (JINR - MLIT)

Presenter: DIMA, Maria (JINR - MLIT)

Session Classification: Workshop "Modern approaches to the modeling of research reactors, creation of the "digital twins" of complex systems" (4-5 July)

Track Classification: Workshop "Modern approaches to the modeling of research reactors, creation of the "digital twins" of complex systems" (4-5 July)