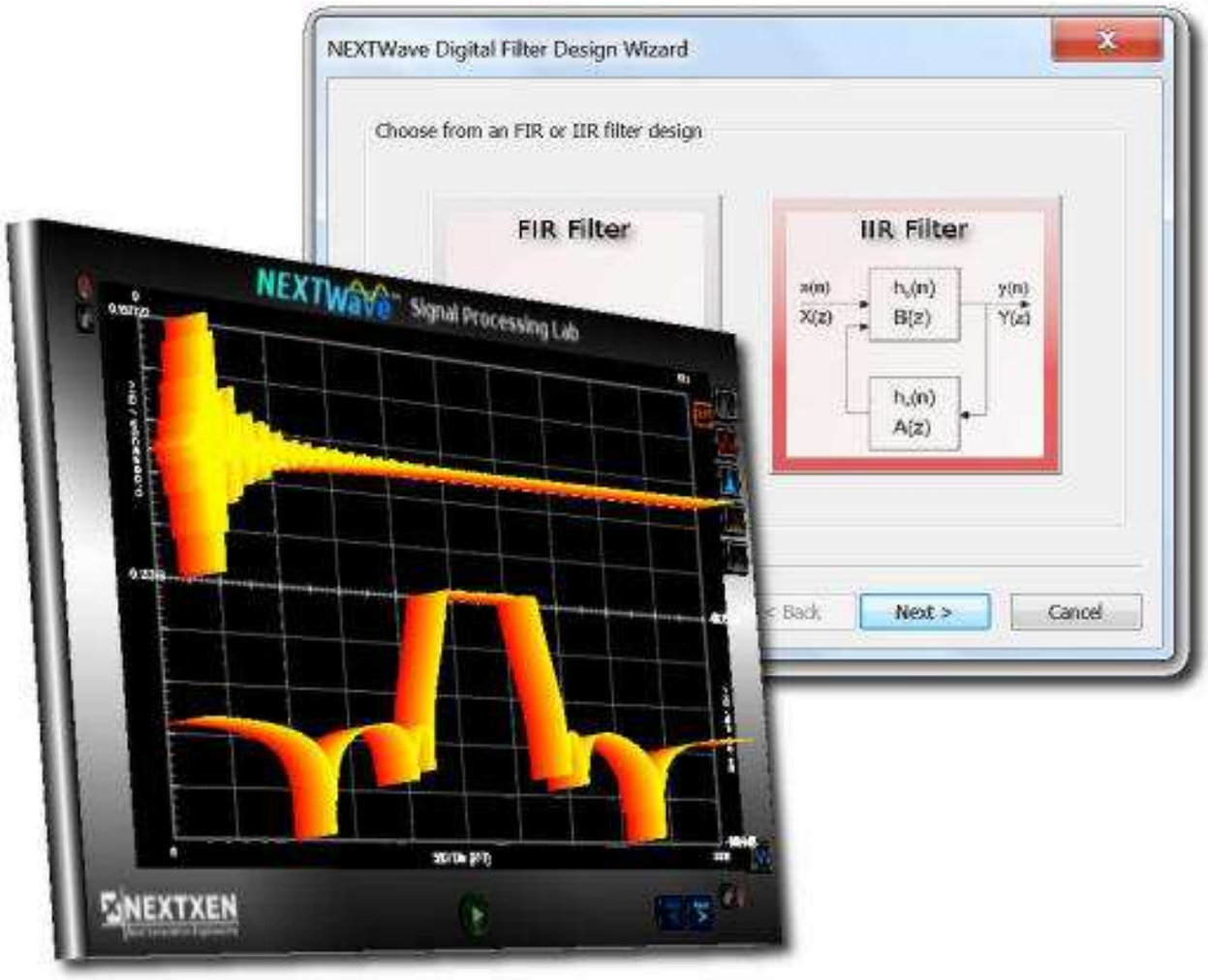
Overview

NEXTWave™

Digital Filter Design Wizard

Software for Basic Digital Filter Design with Automatic C Source Code Generation



Technology is always evolving - isn't it time your development evolved as well?

NEXTXEN

A Simple Tool for Digital Filters

Features

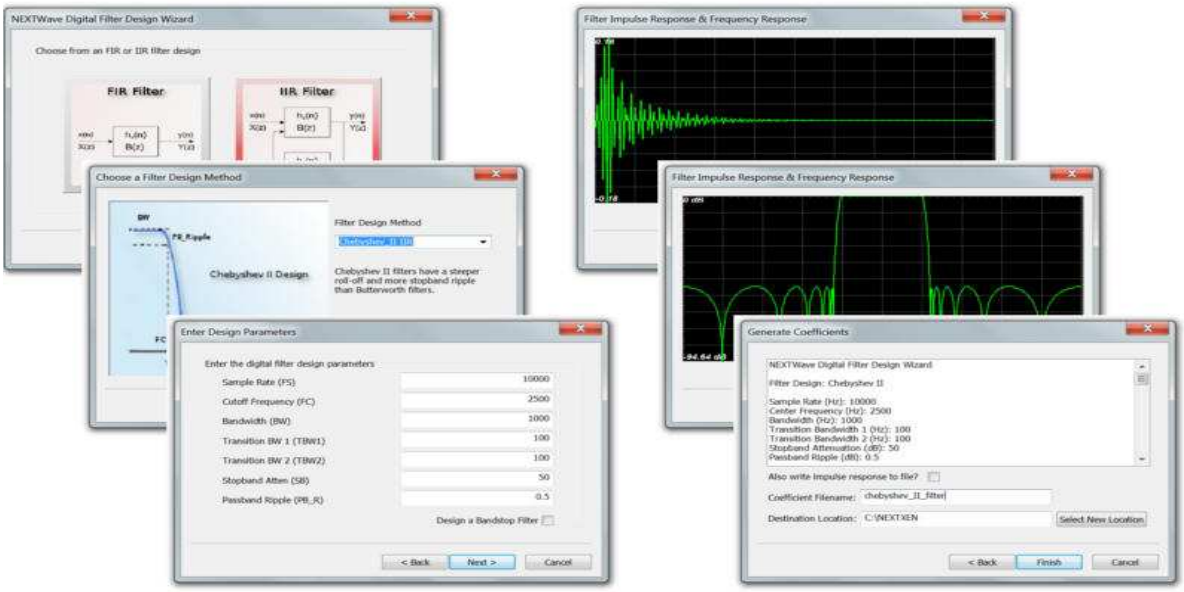
- FIR and IIR Design Selection
- Coefficient File Creation
- C Source Code Generation
- Impulse Response Generation
- Frequency Response Generation
- Useful for Embedded Application Development

Benefits

- Reduction in Project Cost Associated with Man-time Savings
- Reduction in Project Schedule
- Reduction in Learning Curve
- Reduction in Project Risk

Overview

The NEXTWave Digital Filter Design Wizard provides a streamlined approach to creating FIR and IIR filter implementations. This software tool walks the user through easy-to-follow steps that result in the digital design of Butterworth, Chebyshev I, Chebyshev II, elliptic, and Kaiser window filters. Impulse and frequency response displays of the generated filter are provided, as well as a file containing c source code to implement the filter.



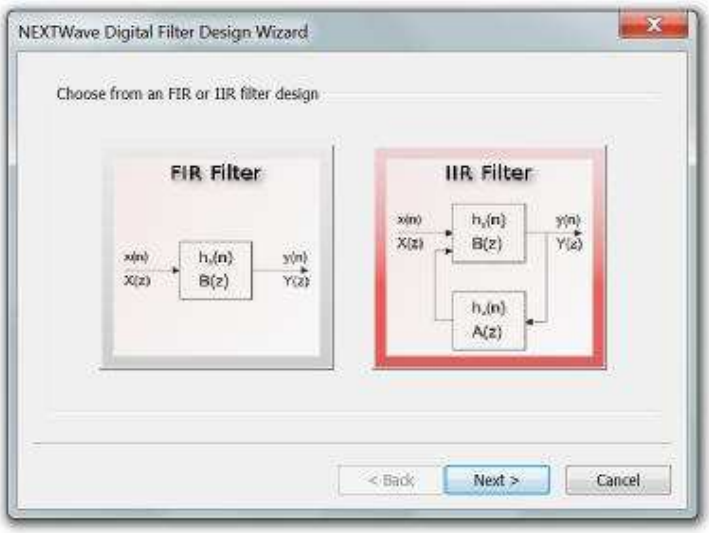
No Expertise Required

An important consideration for the NEXTWave Digital Filter Design Wizard was that it provide for the design workable digital filters without requiring a significant burden with regard to the learning curve of the tool. This tool was designed to be practical and to-the-point; you will be designing digital filters, with coefficients and c source code, within minutes after installing the wizard.

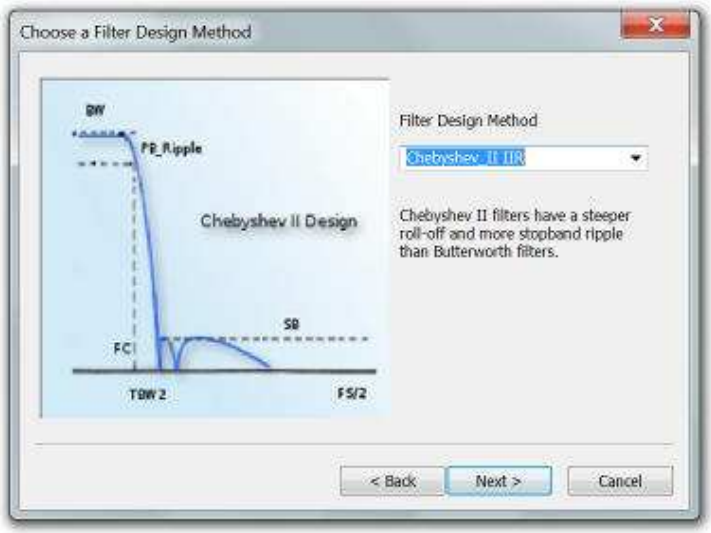
FIR and IIR Filter Design

Digital Filter Overview

Digital filtering is one of the most common applications of DSP. Analogous to analog filtering, digital filtering simply applies a digital filter to a waveform to somehow improve the signal. The resulting filtered waveform contains only the information allowed to be passed through the filter. Mathematically, a digital filter may be thought of as simply a set of coefficients which are applied to the incoming signal in some fashion.



The first step is to select the type of digital filter - FIR or IIR



Select the specific design method and enter the desired filter parameters in the next screen

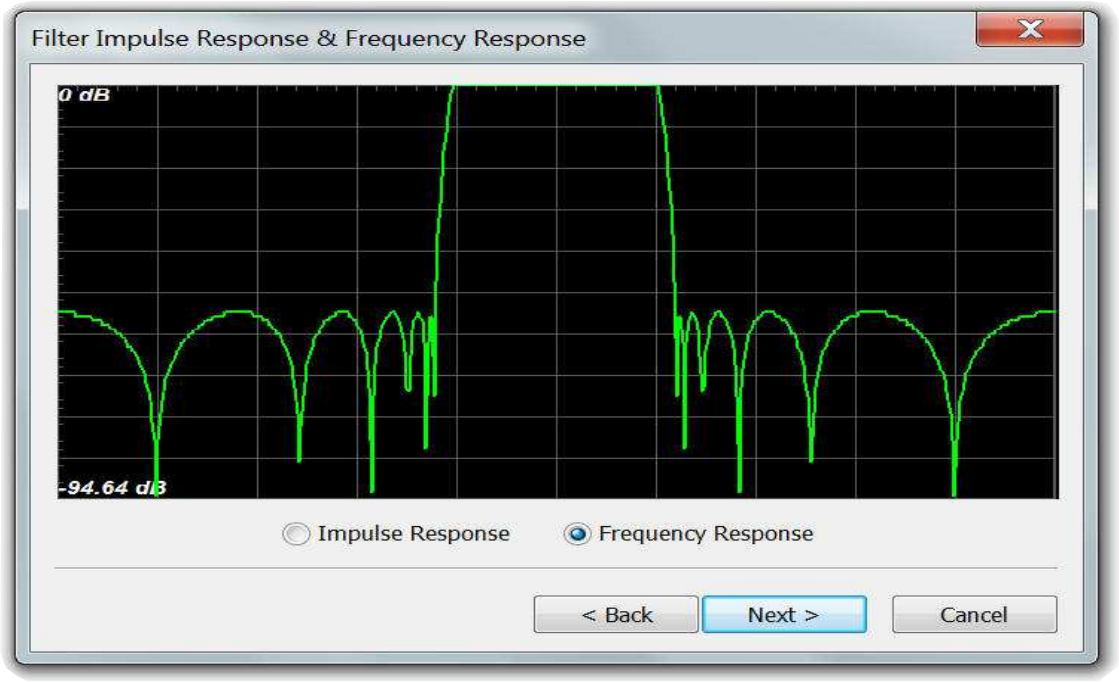
FIR/IIR Filter Designs

There are two main categories of digital filtering - Finite Impulse Response (FIR) and Infinite Impulse Response (IIR). The algorithm structure determines whether a digital filter is FIR or IIR, and there are different characteristics for each. Generally FIR filters require more coefficients and processing time to achieve a magnitude response comparable to an IIR filter. The FIR filter, however, produces linear phase as a result of its processing architecture. While the IIR filter does not produce linear phase, it is important to note that there may be regions of near linear phase which might be adequate for some applications; the application itself determines which particular choice of filter is best.

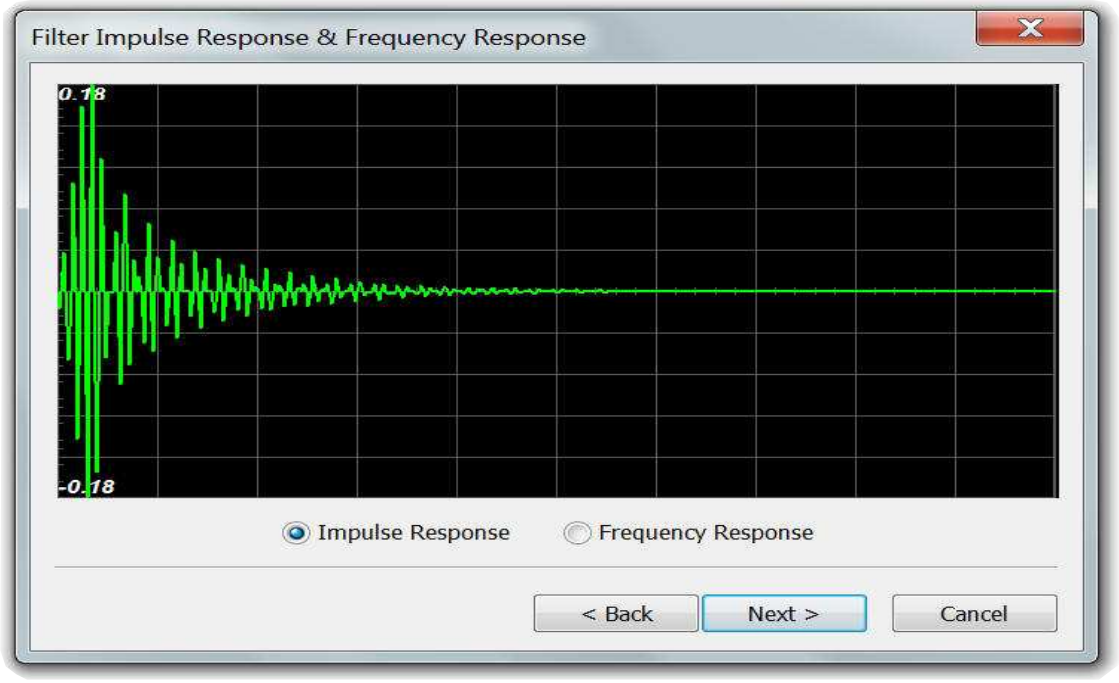
FIR/IIR Design Choices

The Digital Filter Design Wizard allows for FIR filter design using a Kaiser window design methodology. For IIR filters, the design choices include Butterworth, Chebyshev I, Chebyshev II, and elliptic filter types.

Get a Quick Look at Your Filter in Time and Frequency



Frequency Response of Designed Digital Filter



Impulse Response of Designed Digital Filter

Filter Analysis

Although the digital filter design wizard is not intended to be a complete filter analysis package, it does provide for basic time and frequency domain analysis of your designed filter. Both the impulse response and frequency response of the filter may be viewed graphically in one of the wizards later screens.

Impulse response

The response of the filter to an impulse is often used to characterize a filter.

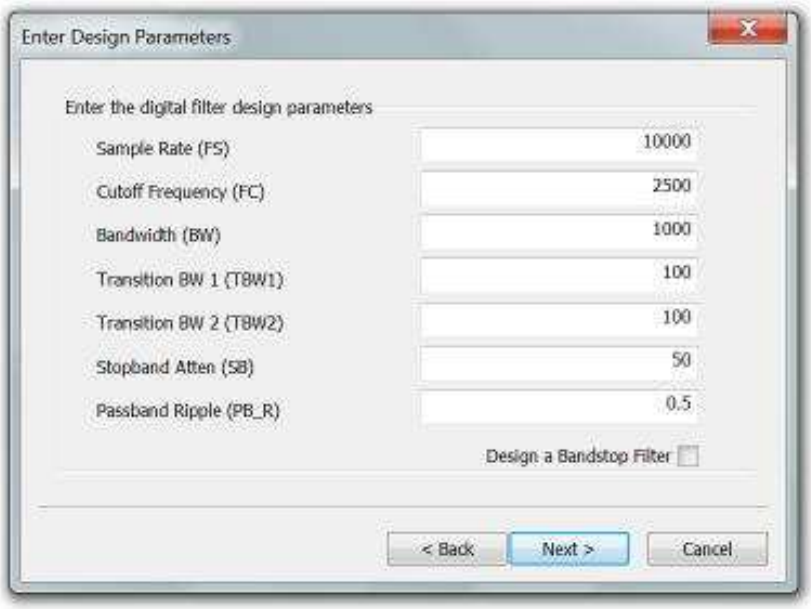
FIR Filters

FIR filters are a kind of filter whose response to an input impulse (impulse response) is of finite duration. This means that when we hit the FIR filter with an impulse, the filter will produce something with energy for short duration afterward; after that ini - tial output, the filter will put out zero, or no energy.

IIR Filters

The IIR filter has, as the name implies, an infinite impulse response. Unlike FIR filters, IIR filters utilize a recursive structure in their algorithm. Another way of saying this is that the filter uses feedback; the IIR filter produces an output 'filtered' value which is a weighted combination of both the current input samples and the pre - vious output samples, therefore, its response goes on forever.

Uses a Wizard Approach to Make it Easy



Parameter Entry Screen for Digital Filter Design

Easy Learning Curve for Fast Productivity

Using the Digital Filter Design Wizard is easy - simply follow a series of dialog screens and enter your design specifications. Filter design specifications are entered easily via simple to follow instructional screens in a direct step-by-step manner:

- Select the type of filter you want to design
- Enter your desired filter design specifications
- Observe filter's impulse and frequency response
- Automatically write the filter coefficients to file where you can access it
- After designing your filter, the coefficient files are ready for use in developing your application using standard development tools (such as a C compiler).

Filter Coefficient Generation

The Digital Filter Design Wizard produces a filter coefficient file when finished. This text readable file contains the digital filter coefficients required to implement the newly designed filter. The user need only implement the filter using additional software tools to create code for the filter; this may be accelerated by using the c source code which is output from the wizard.

C Source Code Generation

The file containing standard C source code is produced which will implement the filter using the newly created coefficients. The C source code includes both the filter as well as code to produce an impulse to feed into the filter. The source code may be used as-is or modified and incorporated into the user's own software application.

Have signals to analyze? Check out NEXTWave SPL!

NEXTWave Signal Processing Lab (SPL) is a related product to NEXTWave Filter Design Wizard for **signal analysis** and **signal processing**. Traditionally software for signal processing and data analysis has been difficult to learn, cumbersome to use, and nearly impossible to master - and often times it does not even provide you with a gratifying analysis and visualization experience for your data. NEXTWave SPL was designed by engineering professionals to allow for exciting, sophisticated visualization of your data while providing a fresh dynamic user experience - all without ever requiring you to deal with a steep learning curve.

NEXTWave SPL - a Low Cost Affordable Solution

NEXTWave SPL works as extension of your thought process where you can quickly take an idea from concept to realization. This approach makes it easy to import and create data to move you quickly through your project, and allows you to go as far as your application needs take you. Learn things about your data that you've never seen before. This environment is exceptionally fast and ensures a live, animated, exciting user experience for your application.

NEXTWave SPL

Summary of Features

Analysis

- Live Virtual 3D Signal Analysis
- Advanced Time and Frequency Displays
- Impressive Spectrographic Frequency Analysis

Processing

- Extensive Algorithm Library
- Open Software Architecture
- Digital Filtering, DSP Transforms, and more

User Interface

- Template Wizard to help you get started
- Convenient File Import and Export Capabilities
- Gesture-based Waveform Panning/Manipulation
- Direct PDF Export
- Support for Data Acquisition Hardware

Benefits

- Gain new insight into your data as it relates to your application needs
- Reduced Learning Curve
- Reduced Project Risk
- Reduced Budget Concerns
- Ability to Work with Your Own Existing Data

More Information

NXMK9010, NEXTWave SPL Implentation Details
NXMK9090, NEXTWave SPL Applications

How to Order

Order online, call, or email/fax a Purchase Order.

NOTE: Academic institutions may qualify for a discounted price on software

NEXTWave Digital Filter Design Wizard Part Number

Standard Edition: NXSF0100

Includes digital filter design with coefficient generation and c source code generation

Visit us on the web and find out more about NEXTWave SPL.

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