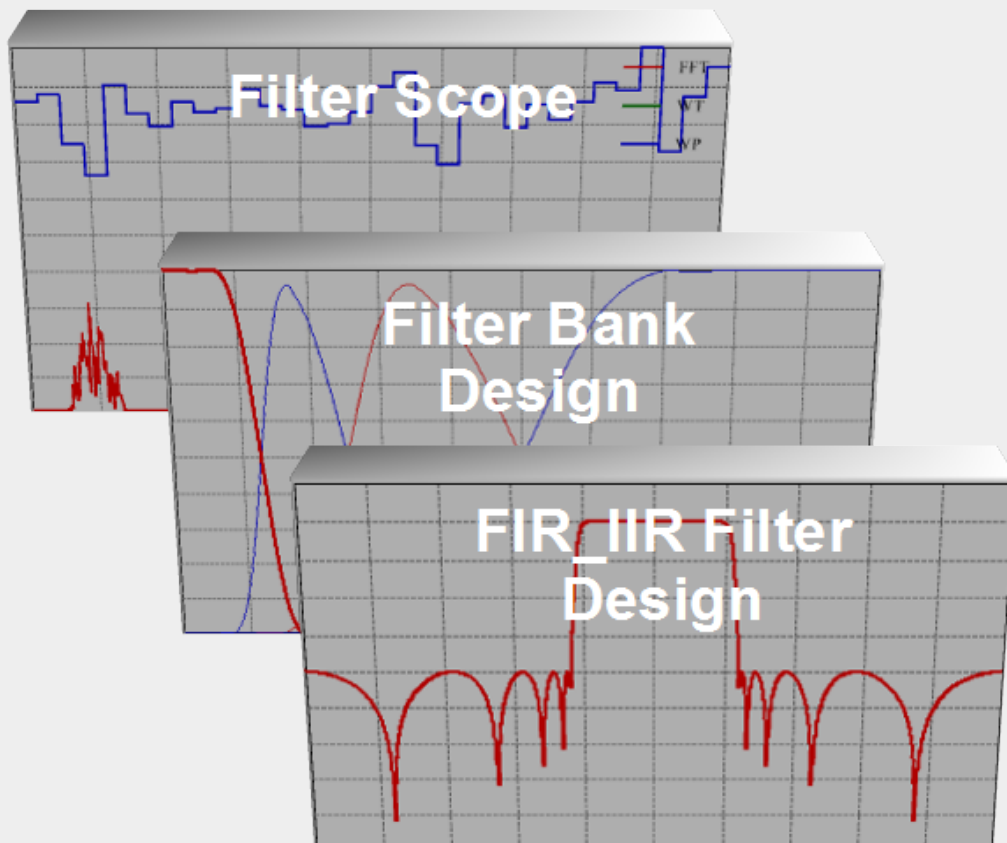


# FILTER DESIGN

Digital filter and  
filter bank design software package

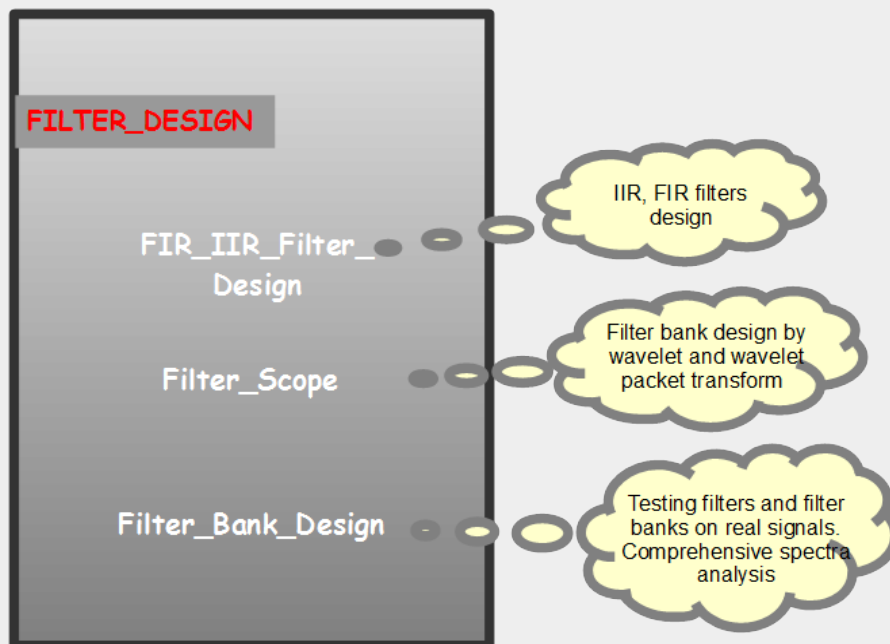


**INNOSOLVE**

the innovative solution in digital signal processing

# FILTER DESIGN

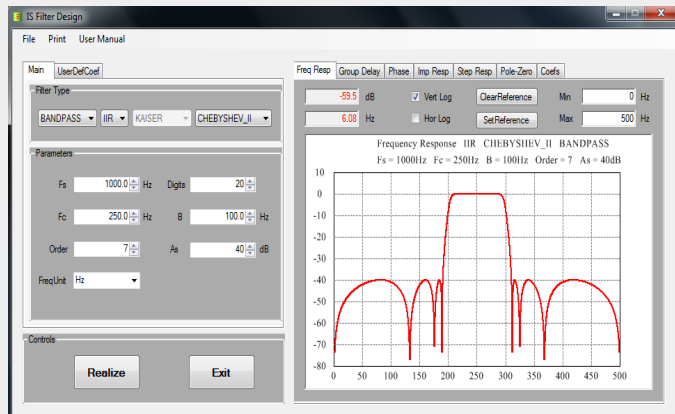
- ◆ The **FILTER DESIGN** consists of three modules developed by Innosolve Ltd. for designing digital filters and filter banks and test them on real signals.
- ◆ After download and install, each module operates in *Trial version* mode with some limitation in functions, but without time limitation. With the help of the demo files almost all functions can be tested.



- ◆ In case of purchasing, Innosolve Ltd. Sends an activation key according to the purchased product (licence) to you. This key is valid for one computer only. It validates the corresponding program modules.

## FIR IIR Filter Design module

IIR and FIR filters can be designed by the most commonly used methods in a user-friendly environment.



### FIR filters

- Taps up to 9999
- Rectangular, Bartlett, Hahn, Hamming, Blackman, Kaiser, ParksMcClellan
- Optimises coefficients
- Implementation

### IIR filters

- Orders up to 20
- Bessel, Butterworth, Chebyshev I, Chebyshev II
- Implementation by cascade filters

### Graphs

- Amplitude-frequency
- Lin – log mode on both axis
- Selecting reference curve
- Phase – frequency
- Group delay time – frequency
- Impulse response
- Step response
- Pole – zero diagram
- Measurement function on both axis directions

### Display coefficients

- Numbers only
- Numbers with array indexes

### Calculating graphs from user defined coefficients

- Defines coefficients in both the numerator and denominator of polynomial
- Up-sampling function

### Archive

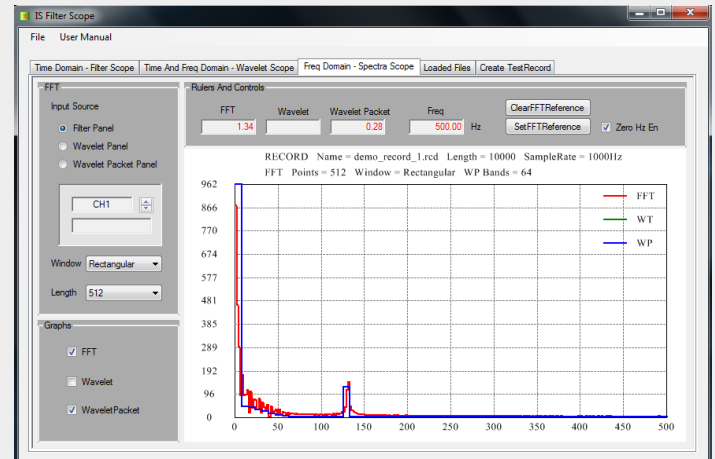
- Saves / loads designed filters
- Saves graphs to file format
- Saves FIR filters as wavelet basis

## Documentation

- Printing
- Copying graphs in picture format
- Copying coefficients in text format

## Filter Scope module

Filter Scope program provides effective assistance in testing digital filters and filter banks designed by FIR IIR Filter Design and Filter Bank Design.



### Creation of test records

- Sinusoid
- White noise
- User defined samples
- Down-sampling
- Up-sampling
- Multiplying samples by constant
- Adding null level

### Time domain graphs

- Zooming channels both horizontally and vertically
- Shifting channels horizontally
- Measurement of time and amplitude
- Measurement of delay time between channels
- Selecting channel to be displayed in case of Wavelet and Wavelet Packet

### Frequency domain graphs

- FFT spectra
- Any filtered signal can be tested by FFT
- Frequency response of Wavelet and Wavelet Packet transform can be measured on real signals
- Setting reference FFT
- Wavelet spectra
- Wavelet Packet spectra
- Displaying graph values

## Documentation

- Copying graphs in picture format

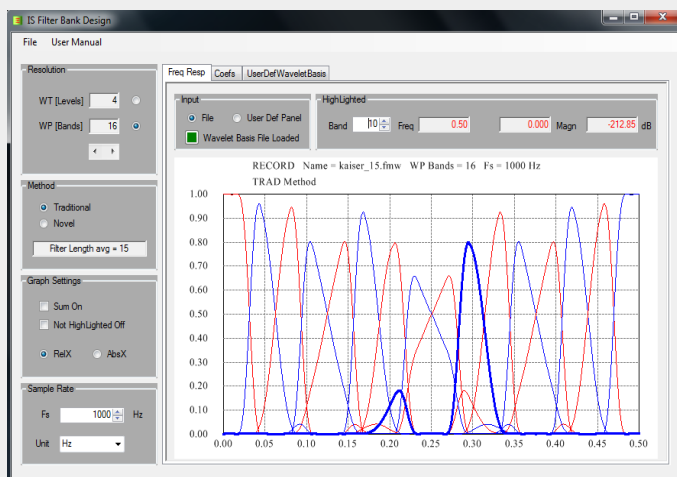
## Archive

- Saves spectra to file
- Saves test records and filtered signals to file
- Saves Wavelet and Wavelet Packet bands to file

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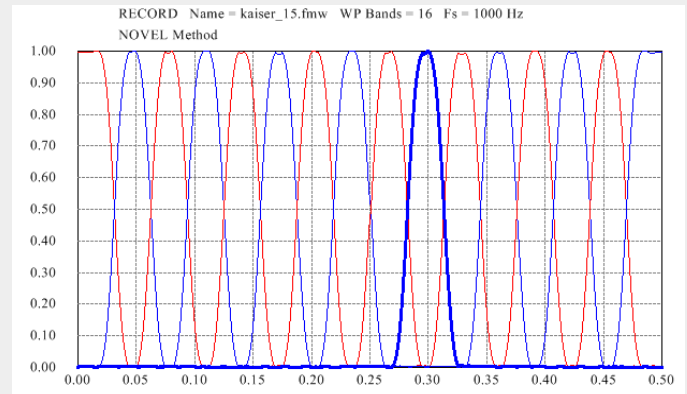
## Filter Bank Design module

Filter banks can be designed by Wavelet and Wavelet Packet transform in a user-friendly environment using Filter Bank Design program.



## Application fields of Wavelet and Wavelet Packet transform

- Provides simple and complex filter banks
- Measurement function of harmonic components
- Spectra analyser
- Denoising signals
- Calculating spectral features
- Decimation
- Interpolation
- Compression
- Increases efficiency of FIR filters



*Wavelet Packet filter bank by Novel method*

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## Filter bank implementation

- By Wavelet transform 1 – 8 levels,
- By Wavelet Packet transform 2 – 256 bands
- Eliminates crosstalk distortion by Novel mode
- Calculates Wavelet vector for implementation

## Wavelet filter (wavelet basis)

- Designed by FIR IIR Filter Design
- Designed by user defined FIR LP and HP filters

## Graphs

- Calculates and displays amplitude-frequency graphs
- Measurement function on frequency bands

## Archive

- Saves Wavelet vector to file
- Saves user defined Wavelet vector to file
- Saves amplitude-frequency curves to file

## Documentation

- Copies graphs in picture format
- Copies coefficients in text format