DISPRO®

- Easy to use pull-down and pop-up menus speed and simplify the design process
- Entry of specifications on graphics model of desired frequency response
- User control of all tradeoffs between specifications and order / length
- Independent entry of filter order / length and specifications
- Full retention of parameter values during tradeoff analysis—no retyping
- Hardcopy output of any screen plot on Epson or HP LaserJet compatible printer
- Automatic naming of filter data files, with user override

FILTER DESIGN _____

- **IIR FILTERS DESIGNED VIA BILINEAR-Z TRANSFORMATION**
  Low Pass, High Pass, Band Pass, and Band Stop
  Up to order 99
  > Butterworth
  > Chebyshev I
  > Chebyshev II
  > Elliptic
  User-controlled ordering of biquad sections
  Scaling of biquad sections to combat overflow in fixed-point arithmetic

- **FIR LINEAR-PHASE FILTERS**
  Parks-McClellan-Remez
  > Up to length 2000
  > Low Pass, High Pass, Band Pass, and Band Stop
  > Multiband (up to 7 bands)
  > Approximate length computed from specifications—can be overridden
  > Compensation for zero-order hold distortion (sin x / x rolloff) of DAC
  > *Arbitrary Magnitude Shape Specification*:
  >> Linear or dB amplitude scale
  >> Piece-wise linear interpolation between specified points
  >> Values input from file or keyboard
  >> Built-in editor for specified point values
  >> Keyboard input can be saved to disk file
  Kaiser-Windowed
  > Up to length 8191
  > Low Pass, High Pass, Band Pass, and Band Stop
  > Approximate length computed from specifications--can be overridden

- **COEFFICIENT VALUES & WORDLENGTHS FOR ALL FILTERS**
  32-bit Floating-Point
  4-bit to 24-bit Integer / Fixed-Point
  Displayed on screen or printed: decimal, integer, 2's-complement hex values

- **POLE-ZERO VALUES FOR IIR FILTERS**
  For Floating-Point Coefficients
  For 4 to 24 bit Integer / Fixed-Point
  Table of Numerical Values (magnitude, angle in degrees and Hz)
  Graphics plot in z-Plane

- **FREQUENCY RESPONSE COMPUTATION AND PLOTTING**
  Any coefficient wordlength
  Linear or dB magnitude
  Numeric values for any set of frequencies, displayed on screen or printed
  FIR:
  > Full range plot: up to 4096 points using FFT
  > Any frequency range: up to 1000 points
  > Specified arbitrary-magnitude values can be plotted with actual response
  IIR:
  > Any frequency range: up to 1000 points
  > Phase (degrees) and delay (samples)

DISPRO®

FILTER PERFORMANCE EVALUATION ....

- **TEST SIGNAL GENERATION**
    Sum of sine waves:
    - Specified by Fourier series coefficients
    - Specified as arbitrary frequencies, amplitude, and phase
    Special waveforms:
    - Rectangular pulse (arbitrary starting point, amplitude, and length)
    - Square wave (arbitrary period, amplitude, and number of periods)
    - Sawtooth wave (arbitrary period, amplitude, and number of periods)
    - Triangular wave (arbitrary period, amplitude, and number of periods)
    - Chirp signal (arbitrary initial & final frequencies, and length)
    - Gaussian white noise, arbitrary rms level (can be added to sum of sine waves)

- **IIR & FIR FILTER SIMULATION**
    - IIR Biquad Topology: Canonic form and Merged-biquads
    - FIR Topology: Direct implementation of convolution sum
    Arithmetic:
    - Computation wordlength: 3 to 23 bits-plus-sign
    - Accumulator: single / double length, saturating / 2's-complement arithmetic
    - Truncation or rounding
    Coefficients:
    - Any wordlength less than or equal to computation wordlength
    - Scaling by any power-of-two
    Excitation:
    - Test signal file
    - User-created file in proper format
    - Impulse
    - Step
    - Sine Wave

- **TIME-DOMAIN PLOTTING**
    - Linear or log-of-absolute-magnitude amplitude scale
    - Decimal or integer values for linear amplitude scale
    - Continuous or discrete-line plots, with optional marking of data points
    IIR and FIR Filters:
    - Forced-response
    - Impulse response
    - Step response
    - Sine Wave response
    - Excitation signal file
    - User-created file in proper format

- **SPECTRAL ANALYSIS**
    - Fourier series or Fourier transform
    - Real-input FFT up to 8192 points
    - Optional time sample windowing (Hann, Hamming, Blackman, Kaiser)
    Data sources:
    - Forced-, impulse-, step-response samples for IIR & FIR filters
    - Any time sample file in proper format
    - Keyboard input of sample values (which can be saved to a disk file)
    Integrated plotting:
    - Linear or dB magnitude
    - Phase (degrees)
    - Magnitude values: unnormalized; normalized to peak or specified component
    - Continuous or discrete-line plots, with optional marking of data points
    Tables of numeric values:
    - Linear or dB magnitude
    - Phase (degrees)
    - Magnitude values: unnormalized; normalized to peak or specified component
    - Show only values above / below a specified threshold
    - Displayed on screen or printed